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U. S. DEPARTMENT OF HEALTH

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ERRATA.

- Vol. 28, No. 2, p. 128, Jackson summary, line 1, *for* Forty-seven children *read* Four hundred and seventy-one children.
- Vol. 28, No. 7, p. 531, footnote. Translation from Horace. *For* "Whate'er the preconceptions are" *read* "Whate'er thy preconceptions are"
- Vol. 28, No. 7, p. 534, heading of third summary, *for* NUTTALL (H. F.) *read* NUTTALL (G. H. F.).

TROPICAL DISEASES
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[No. 1.

BLACKWATER FEVER.

YORKF (Warrington), MURRAY ROYD (F.) & OWEN (D. Uvedale). **Observations on Five Cases of Blackwater Fever.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1930. Jan. 30. Vol. 23. No. 4. pp. 335-372. With 5 charts. [28 refs.]

This paper is based on an intensive study of five cases of blackwater fever admitted to the hospital of the Liverpool School of Tropical Medicine. Two of the patients were sailors who had been travelling to and from the West Coast of Africa for many years; the other three were old residents there. Each of them gave a history of one or more attacks of malaria, and in every case the onset of blackwater was immediately preceded by attacks of malaria. In four of the cases, the blackwater developed after admission to hospital, while they were undergoing treatment for malaria. Case (1) had been in hospital three days, and had taken 45 grains of quinine; case (2), four days, with 30 grains; case (3), three days, with 105 grains; case (4), three days, with 90 grains. In one case, an injection of 15 grains, given shortly after the onset of blackwater, was followed by an exacerbation, and a further dose, three days after the haemoglobinuria had ceased, was followed by a relapse. Dr. G. R. Ross, in the discussion following the paper, agreed that the part played by quinine in the genesis of the attack was considerable, and that sometimes the relationship was dramatically demonstrated.

Touching the question of a recognizable pre-blackwater stage, as defined by MANSON-BAHR, the authors observed no premonitory signs in their patients to suggest that they were going to develop blackwater; its onset was wholly unexpected. Examination of the blood and urine, before the onset, showed neither increased haemoglobinaemia in the one, nor increased urobilinogen in the other. In one of the cases, the physical appearance of the patient suggested a haemolytic process which commenced suddenly, for, within a few hours of the onset, he was obviously anaemic, and within 48 hours he was blanched. The authors do not look upon blackwater as a single event resulting in the destruction of a large proportion of the red blood cells, but rather as a

of events spread over several days. In one of their cases, for example, the count was 3,620,000 two hours after the onset ; during the first 12 hours the decline in the number of corpuscles was 200,000 ; during the next 24 hours it was 700,000 ; during the next 24 hours it was 1,200,000. The rapid fall from 3,620,000 to 1,600,000 red cells indicated how great the haemolysis was—a loss equal to 2 litres of blood ; but only a small proportion of the haemoglobin liberated by this blood destruction was passed in the urine. The total amount which escaped in this way represented only about 185 cc. of blood, and the same was observed in other cases. During the first two days, the plasma of this patient contained an amount of haemoglobin approximately equal to a 0.5 per cent. solution of normal blood ; just after the period of most intense haemoglobinuria, on the third day, it rose to 1.1 per cent. In another case haemoglobin values as high as 0.5 per cent. were recorded on certain days when there was no haemoglobinuria ; there was great renal impairment in this case, and it is suggested that this raised the threshold for haemoglobin. The degree of haemoglobinaemia is strikingly small, in view of the massive haemolysis, when compared with the haemoglobinaemia of dogs infected with babesia, where values up to 12.5 per cent. have been recorded. In babesia, the haemolysis is in direct proportion to the degree of infection and it occurs in the blood-stream. The relatively low haemoglobinaemia values in blackwater fever may be due to the haemolysis taking place in the sinuses of the liver and spleen, the haemoglobin reaching the blood-stream more slowly than in babesia infections. The contents of these venous sinuses are probably discharged at irregular intervals, thus producing the series of critical exacerbations.

It is suggested that the haemoglobin is rapidly converted into bilirubin A, which is converted into bilirubin B in the liver. The occurrence of haemoglobinaemia, and the demonstration that the kidney lesions seen in blackwater fever can be produced in an experimental animal by the inoculation of its own haemoglobin, disposes of PLEHN'S hypothesis. This hypothesis is to the effect that the primary lesion in blackwater lies in the kidney, and that a direct communication between the capillaries and tubules permits the escape of blood direct into the urine where it is laked owing to the absence of urea and salts. As to the cause of the haemolysis, the authors agree that there is no doubt that previous malaria is essential for the development of blackwater, but they do not agree that its appearance results from the sudden destruction of large numbers of parasites. Parasites were found, on admission, in only two out of four cases which developed blackwater in hospital ; and, in these two, the infection was very scanty. One of them had been under quinine treatment in hospital for three days before the onset of blackwater, and all trophozoites had disappeared ; a spleen puncture was made three hours later, but no parasites could be found except a few crescents ; yet, in spite of this, a series of very severe haemolytic crises occurred during the next 48 hours.

The authors question the accuracy of the dicta that : (1) the degree of infection of the peripheral blood, in subtertian malaria, is not a criterion of the mass of infection in the body, and (2) that the trophozoites retire to internal organs to complete their schizogony. In simple tertian malaria they found that blood from the ear and from the spleen showed the same degrees of infection. In seven cases of malignant tertian, they

found a similar correspondence between films made from the peripheral blood and from the spleen ; when the infection was scanty in the peripheral blood, it was scanty in the spleen also. SORGE (see this *Bulletin*, Vol. 26, 1929, p. 929) has shown that the bone-marrow is not a swarming ground for parasites. Segmenting trophozoites were not found in spleen smears in light infections with malignant tertian, and the authors suggest that *P. falciparum* may multiply by binary fission ; an hypothesis which would explain the large proportion of rings possessing two chromatin dots and also the frequency with which red cells contain more than one ring. The orthodox view is based on the finding of schizonts in the capillaries of the internal organs after death, and in the peripheral circulation only in severe and fatal infections. It seems to the authors " quite possible that *P. falciparum* may behave in one manner when its reproduction is practically uncontrolled, as in the culture tube, in the terminal stages of fatal infections, and even in comparative health, in such situations as the placental sinuses ; but in quite a different manner when it is subject to the control exercised by the host in infections of ordinary severity "

In the discussion which followed Dr. C. M. WENYON said that malignant tertian rings grew into schizonts on culture in the same way as the rings of the other forms, and that, as there was no reason to assume reproduction by binary fission in the case of simple tertian and quartan parasites, it was unnecessary to do so for the malignant forms. Dr. Gordon THOMSON also disagreed with this hypothesis of binary fission. Dr. G. W. ROSS agreed with the lecturer and his colleagues that it was impossible to distinguish a pre-blackwater state. The degree of bilirubinaemia in his cases was much greater than in these. He regarded the early indirect reaction of the van den Bergh test as due to haemolysis, and the direct reaction, which appears later, as due to obstruction from inspissated bile. Dr. MANSON-BAHR agreed that the haemolysis probably took place in the spleen, which shrinks rapidly as the haemolysis clears up. BARCROFT's observation on the shrinkage of the spleen after extensive blood destruction supported this hypothesis. The last four cases at the Hospital for Tropical Diseases in London had been transfused with blood and the results had been better than anything he had seen before. Dr. Hamilton FAIRLEY concurred in the efficacy of this treatment. He drew attention to the great danger of giving intravenous injections of sodium bicarbonate ; this drug was nevertheless of great benefit by the mouth, and it should always be given by that route. He agreed with Dr. MANSON-BAHR that the careful observation of a small number of cases in England was likely to be more useful than a host of undigested statistics procured as the result of wanderings in the bush. A team was investigating the disease at the Hospital for Tropical Diseases, in conjunction with Dr. McNEE. Dr. Uvedale OWEN stated that he had found during the treatment of polycythaemia with phenol hydrazin, that a definite degree of haemoglobinaemia must be reached before haemoglobinuria occurred, showing that there was a renal threshold for haemoglobin. Dr. Low agreed with the lecturer that there was no recognizable pre-blackwater state. He endorsed the view that the transfusion of whole blood was of great value. Blackwater fever was still a riddle ; there were definite blackwater areas, he said, and geographical distribution of malaria did not correspond with the

William F. Fairley

EBERT (M. K.). Zur Frage der Pathogenese der Hämoglobinurie bei der Malaria (Schwarzwasserfieber). IV. Mitteilung. [**The Pathogenesis of Haemoglobinuria in Malaria (Blackwater Fever). IV. Communication.**—*Ztschr. f. Immunitätsf. u. Experim. Therap.* 1930. Vol. 65. No. 1/2. pp. 161–175. [11 refs.] [Microbiol. Research Inst., Education Commissariat R.S.F.S.R., Moscow.]

The present work is a continuation of previous investigations on this subject by KRITSCHESKI, MURATOWA and the author [this *Bulletin*, Vol. 21, p. 386 and Vol. 25, p. 160 and p. 900]. It had been found in the earlier work that the individuality of the erythrocytes played an important part in the amount of haemolysis resulting from the combination quinine+lecithin. Ebert has now examined the erythrocytes from 100 individuals representing all four blood groups with a view to ascertaining whether the differences are related to the different blood groups. His observations are summarized in tables from which it is seen that the variations in intensity of haemolysis depended on variations in the erythrocytes of different individuals and had nothing to do with blood groups.

In further experiments the effect of temperature on the reaction was examined. Observations were made at 37° C. and at 40° C. respectively, and it was found that raising the temperature increased the intensity of the quinine+lecithin haemolysis. Similarly it was found that raising the temperature likewise increased the intensity of the quinine+serum haemolytic reaction of GHIRON [this *Bulletin*, Vol. 24, p. 657].

Ebert then passes to a consideration of the effect of alcohol on the reaction. He remarks that the use of alcohol during the course of malaria and other infections is harmful and quotes ZIEMANN in support of his contention. Experimental work showed that the resistance of red cells, which have been previously subjected to the action of minimal quantities of alcohol, and of red cells from a chronic alcoholic, is lowered so that a more intense haemolysis results when they are subjected to the influence of quinine+lecithin.

W. Yorke.

NOCHT (B.). Ueber hämolytische Chininwirkungen. [**On the Haemolytic Action of Quinine.**—*Beihefte z. Arch. f. Schiffs- u. Trop.-Hyg.* 1929. Vol. 33. No. 3. pp. 21–24 (105–108).]

In this address Nocht summarizes his views on the mechanism of the haemolytic crisis in blackwater fever; he bases his argument mainly on the recent experimental work of KIKUTH and himself [this *Bulletin*, Vol. 26, p. 1028].

It was found that quinine greatly intensified the haemolytic action *in vivo* of heterogeneous haemolytic amboceptors, cobra venom and lysozithin, but had no effect on that due to toluylenediamine and phenylhydrazine. This intensifying action was, however, not seen in experiments performed in the test tube. On the contrary, however, quinine assisted the haemolytic action of lecithin in the test-tube, but in the animal body. Other cinchona alkaloids such as cinchonine, substances like plasmochin or antipyrin, did not exhibit this effect of intensifying the haemolytic action of amboceptor and cobra

Turning to the question of prevention of blackwater fever, 1 states that so long as malaria was treated by decoctions of

bark blackwater fever was practically unknown. One alkaloid of cinchona, viz., cinchonine, does not intensify haemolytic processes like quinine, but unfortunately it is not so active against tropical malaria as is quinine. It has been recently shown that "kinetum," a total extract of cinchona bark, is just as active in malaria as quinine itself. Should experiments show that kinetum does not intensify haemolytic processes or does so to a much less extent than quinine, then we shall have in kinetum and plasmochin drugs which will do much to lessen the ravages of blackwater fever.

W. Y.

BOASE (A. J.). **Report on Blackwater Fever in Uganda for 1928.**—*Uganda Protectorate Ann. Med. & San. Rep. for Year ended 31st December, 1928.* Appendix No. IV. pp. 84–89. With 1 chart.

During the year 1928, 166 cases of blackwater fever were treated in the Protectorate. This number is considerably above that recorded for 1927 and is the second highest figure reported for any year. Of the 166 patients 40 (24.1 per cent.) died. In a table the number of cases and deaths occurring in each of the last twenty years is given. Information is also given regarding the distribution of cases (European and Asiatic) throughout the Protectorate. The paper contains a chart showing the seasonal incidence of blackwater fever and malaria, and also the rainfall and temperature of the different months throughout the year 1928. Other information given relates to race, sex, age, length of residence in the tropics, previous attacks of blackwater, quinine habits, microscopical examination of the blood, and so forth.

W. Y.

WHITMORE (Eugene R.) & ROE (Joseph H.). **Further Study of the Blood in Blackwater Fever.**—*Eighteenth Ann. Rep. Med. Dept. United Fruit Company, Boston, Mass. 1929.* pp. 59–64. [5 refs.]

Reference is made to a previous report on the results of study of the blood in blackwater fever (this *Bulletin*, Vol. 26, p. 1026). Irregular results indicated that chemical examination of blood taken to Washington was not entirely satisfactory. Since the publication of this report, the methods of preserving blood by the use of sodium fluoride and of making chemical examinations of blood thus preserved have been improved.* In the present work the determinations of the carbon dioxide combining power of the plasma and the van den Bergh tests were made in the field as soon as the blood was taken. Material for all other chemical examinations was sent back to Washington, the blood being collected in Kimble venules containing 10 mgm. of sodium fluoride per cc. of blood and kept on ice until arrival at Washington. A summary of each of the six cases thus examined is given, and the results of the blood examinations are summarized in the following table.

*Irish, O. J., and Boyd, J. I. The Preservation of Blood for Analysis by the Use of Sodium Fluoride. *Jl. Biol. Chem.* 1927, 685.

RESULTS OF CHEMICAL EXAMINATION OF BLOOD IN BLACKWATER FEVER (WHITMORE).
TABLE.

Patient.	Days standing before Analysis.	Non-protein Nitrogen.	Urea Nitrogen.	Uric acid.	'Creatinine	Sugar.	CO ₂ combining power.	Calcium.	Cholesterol.	Lecithin.	Bilirubin.	Total Phosphorus.
R.D. #12	10	61	40	3.6	1.1	57	49	10.4	178	282	indir. 5.77	35
J.M. #18	10	71	38	6.0	1.3	112	48.5	8.7	114	149	indir. 11.19	34
R.P. #23	15	49	23	4.5	—	82	—	—	182	237	—	—
J.G. #25	15	64	32	4.3	—	113	—	10.0	150	195	indir. 5.19	—
A.G. #20	14	149	72	10.4	3.0	107	—	9.5	125	171	indir. 4.17	22
V. #19	14	182	125	9.1	6.0	128	35	—	160	290	—	24
—	—	25-35	10-15	1-4	1-2	65-110	50-75	9-11	160-200	240-300	0-0.6	25-40

From this table it appears that of the 12 substances determined the sugar, calcium, cholesterol, lecithin and total phosphorus give normal findings. The values of non-protein nitrogen and its fractional constituents show a definite elevation of these substances. The determination of the CO_2 combining power of the plasma shows that in two cases the values obtained were just below the normal limit, whilst in the third case there was a definite reduction of the CO_2 combining power of the plasma; in this case the urinary secretion was re-established when alkali treatment was used.

The article closes with the following remarks:—

Our material is too small to warrant the drawing of any conclusions; but we feel that we have worked out our plan of procedure to where we have a satisfactory method of carrying on these newer studies on blackwater fever; and we can continue with the collection of data. Our results indicate that nitrogen retention is very commonly—if not generally—present; indicating disturbance in the secretory activity of the kidneys; and that this nitrogen retention may be so marked as to give the blood chemistry picture of an acute nephritis. This is in accordance with the post-mortem finding of acute nephritis in some of the cases of blackwater fever. In our results so far there is no evidence of any marked deviation from the normal in any of the other chemical constituents of the blood; notably, sugar, calcium, cholesterol, and lecithin.

W. Y.

GLOVER (W. F.) & CONNALL (Andrew). **An Unusual Blood-Picture in Blackwater Fever.**—*West African Med. J.* Lagos 1929. Oct. Vol. 3. No. 2. pp. 32-33. With 2 figs. on 1 plate facing p. 48.

The patient, who was a ship's cook, had been ill at sea for three days before admission to hospital at Port Harcourt. The temperature had been round about 103°F during that time and there had been persistent vomiting with great restlessness and sleeplessness. He had been given 10 grains of quinine on January 22nd and 23rd. When seen by the authors on the morning of the 24th the patient was dull, apathetic and jaundiced; he looked very ill and there was slight dyspnoea. There was no history of having passed black water. Two hours after admission to hospital he was given 10 grains of quinine di-hydrochloride intramuscularly, and two hours later passed black water. Recovery was rapid. Blood smears made on the day of admission and the following day showed numerous parasites; a number of differential leucocyte counts and Arneth counts are given.

The authors believe that the patient was probably suffering from blackwater fever when admitted to hospital. They observe that the blood picture was remarkable; in addition to the heavy subtertian infection there was evidence of pronounced phagocytic activity of the leucocytes.

W. Y.

1. FAIRLEY (Keith D.). **Cholelithiasis as a Sequel of Blackwater Fever.**—*Lancet* 1930 June 28 pp. 1395-1396. [12 refs.] [Walter and Eliza Hall Inst., Melbourne.]

2. MANSON-BAHR (Philip). **Cholelithiasis after Blackwater Fever.** [Correspondence]—*Ibid.* July 12. p. 106.

3. An interesting account is given of the occurrence of a sub-acute cholecystitis in a patient with a large biliary pigment calculus formed undoubtedly as a result of previous attacks of blackwater fever. The author remarks that the only disease in which calculi of this nature are usually found is acholuric jaundice. The increased resistance of the

red cells to hypertonic saline and the low reticulocyte count are sufficient to exclude this diagnosis in the present case. Reference is made to the fact that many authors have observed characteristic changes in the bile at post-mortems on blackwater fever cases. It is commonly agreed that the gall-bladder in these cases is full of dark inspissated bile. Fairley believes that pigment gall-stones may prove to be a not uncommon sequel of an attack of blackwater fever.

11 Manson-Bahr mentions that he has recently met with an instance of recurrent biliary colic in a patient recovering from a severe attack of blackwater fever. Brief details of the case are given.

W. Y.

CORT (E. C.). **Treatment of Blackwater Fever.**—*Amer. Jl. Trop. Med.* 1929. Sept. Vol. 9. No. 5. pp. 401–406. [12 refs.]
[McCormick Hosp., Chiangmai, Siam.]

After a brief discussion of various theories which had been advanced to explain the genesis of an attack of blackwater fever, the author passes to the question of the treatment of the disease. His cases are divided into two groups. In the first group, consisting of 41 cases, the treatment was largely symptomatic. At first quinine was given in all cases showing parasites and in some others, but small doses, 5 grains, having apparently produced relapses, its use was discontinued in the acute stages of the disease. Atoxyl or sodium cacodylate was given in nearly all cases and the vomiting controlled by small doses of morphine and hyoscine. Fluids were given by the mouth or by injection, and alkalis were used to some extent. The author is of opinion that the most important factors in recovery were the control of temperature by hydrotherapy and the forcing of fluid intake. Of the 41 patients, 8 died, giving a fatality of 20 per cent., which, as the author states, coincides with experience elsewhere.

In the second group, consisting of 26 cases, neo-arsphenamine was given, apparently on the ground that it is useful in the treatment of simple tertian infections and that there is some evidence of its value as an adjuvant to quinine in malignant tertian malaria. The drug was given in small doses 0.15 gm. daily for three days, then after an interval of three days 0.30 gm. and, finally, weekly doses of this amount for three or four weeks and fortnightly doses for the next three to six months. In a few cases the injections seemed temporarily to increase the severity of the haemoglobinuria; but this quickly subsided and convalescence was usually rapid. None of the 26 patients thus treated died. The author remarks that undoubtedly much of the favourable results in the second series of cases was due to improvement in the general treatment, especially in regard to the use of alkalis.

W. Y.

CONIL (J.). **Considération sur le traitement de la fièvre bilieuse hémoglobinoïdique.** [**Treatment of Blackwater Fever.**]—*Bull. Soc. Path. Exot.* 1929. Oct. 9. Vol. 22. No. 8. pp. 739–743.
[Principal Hosp., Dakar.]

The suggestions for treatment discussed in this paper are based on observations of 27 cases of blackwater fever which came under the author's care during a period of 20 months at Dakar. Conil

the usual mortality of the disease—25 per cent.—with his own striking success; he lost only a single case.

The author's treatment always commenced by warming the patient up even though he was no longer cold, and in controlling his desire to en gorge himself with water. He states that the kidneys of a case of blackwater are going to have plenty to do without adding to their work; one does not cure a myositis of the psoas by making the patient walk; flushing the kidneys of a haemoglobinuric is a metaphor and nothing more. Conil never gave more than 2 litres of fluid in small doses in 24 hours, and it was never chilled except when the stomach was so irritable that it could not retain fluid at room temperature. Quinine was never given.

There are two antihaemolysins at our disposal, viz., anti-venom serum and calcium chloride. The author always injects 20 cc. of anti-venom serum morning and evening whilst the urine is coloured and gives 10 gm. of calcium chloride during the 24 hours. As the drug cannot even in dilute solutions be retained by the blackwater fever stomach, it should be given rectally. It is recommended to give twice daily a rectal injection consisting of 300 cc. of a solution containing 45 gm. of glucose per litre to which is added 5 gm. of calcium chloride.

The author does not approve of injections of physiological saline. As the result of 4 years' experience of cholera at Saigon, he has observed that, notwithstanding the brilliant results of treatment of this disease by saline injections, a number of cases, cured of cholera, die of anuria. Believing that the sodium chloride by causing a renal oedema is responsible for this catastrophe, Conil has replaced the sodium chloride by glucose, with the result that the deaths from anuria have been definitely fewer. He states that in his work at Dakar he has often received at hospital blackwater patients who before admission have been given considerable injections of saline; in almost all convalescence was long and tedious with persistent albuminuria. The single fatal case in the author's series belongs to this category.

As soon as the attack of blackwater is definitely over quinine treatment is carefully commenced, beginning with 5 cgm. the first day, 10 cgm. the next, then 20 cgm. and so on, up to 1.5 gm. Daily doses of 4 gm. of calcium chloride are given at the same time.

W. Y.

ARNELL (H. M.). **The Treatment of Blackwater Fever.**—*Kenya & East African Med. Jl.* 1929. Nov. Vol. 6. No. 8. pp. 237–239.

After stating "there is probably, at the moment, a greater divergence of opinion concerning the treatment of malaria and blackwater fever than of any other disease," the author advocates the use of a form or schedule so that records of cases treated by different methods can be compared. The suggested schedule should give full details of the attack, including the temperature chart, pulse rate, duration and intensity of haemoglobinuria, jaundice, amount of vomiting, treatment and nursing.*

W. Y.

* A schedule is in use in the Colonies. Copies could doubtless be obtained from the author and others.

ULMI (Priamo). Contributo alla plasmochinoterapia nella emoglobinuria da chinina dei malarici. [**The Treatment by Plasmochin of Quinine Haemoglobinuria in Malarial Patients.**—*Giorn. di Clin. Med.* 1930. Aug. 31. Vol. 11. No. 12. pp. 874, 877-880.]

Three cases are quoted: (1) a child of 7 years who tolerated euquinine well, but when given quinine tablets [salt not stated] passed black water. Two cgm. daily of plasmochin was followed in 3 days by disappearance of the haemoglobinuria and recovery was uneventful. (2) A man of 42 years, who had a severe attack of blackwater fever on taking quinine for an obstinate malaria infection. Plasmochin 6 cgm. daily for 3 days cleared the urine and the drug was continued, 4 cgm. daily for 45 days, and for the next 2 months, 3 cgm. for 7 days followed by 4 days' rest. (3) A man of 34 years, with history closely similar to the last except that the plasmochin was given by injection in a dose of 3.2 cc., but a month after ceasing to take plasmochin he took two tablets only [? dose] of quinine and the blackwater returned; the patient was very ill with temperature 40.4° C., pulse 150, marked anaemia and respiratory distress. A renewal of the injections of plasmochin brought speedy cure and the drug was thereafter continued by mouth. This preparation was well borne in spite of the idiosyncrasy or intolerance to quinine shown by all three patients.

H. H. S.

YORKE (Warrington). **A Case of Quinine Haemoglobinuria.**—*Ann. Trop. Med. & Parasit.* 1930. Oct. 22. Vol. 24. No. 3. pp. 477-479.

A child of 3 years, born in Rhodesia, was brought to the author in England with a history of passage of black water on five occasions after small doses of quinine (one grain or half a grain). In infancy the drug was taken well, and only after a second attack of malaria did she become hypersensitive to quinine. The author found that the hypersensitivity still persisted but a larger dose was required for its elicitation. On each occasion recovery was rapid.

A. G. B.

LIVERANI (Ettore). Contributo alla conoscenza dell' emoglobinuria da chinino nei malarici. (**Contribution to the Study of the Hemoglobinuria caused by Quinine.**)—*Riv. di Malarologia.* 1929. Nov.-Dec. Vol. 8. No. 6. pp. 674-684. [112 refs.] [English summary pp. 747-748.] [Inst. of Clin. Med., Univ., Rome.]

Details are given of a series of twenty cases of blackwater fever observed in hospital at Rome. Almost all had suffered from malignant tertian malaria, and in all cases the actual attack of blackwater was precipitated by the administration of one of the cinchona alkaloids—17 by quinine, two by chinidin, and one by cinchonine.

W. Y.

MONCAREY. Deux cas d'hémoglobinurie malarienne chez des indigènes du Congo. [**Two Cases of Blackwater Fever in Congo Natives.**—*Ann. Soc. Belge de Méd. Trop.* 1929. Oct. 30. Vol. 9. No. 3. pp. 275-277.]

In view of the fact that instances of true blackwater fever are very rare amongst the natives of the Belgian Congo, the author has considered it worth while recording details of two such cases.

The first was that of a woman, who, on admission to hospital, temperature of 39.2° C., was intensely icteric, and had bilious vomit.

epigastric pain, with enlargement of the liver and spleen. Shortly after admission she passed 150 cc. of almost black urine. The following day she developed suppression and eventually died of coma. Examination of the blood showed a scanty infection of *Plasmodium falciparum*.

The second case was that of a man who had a mild attack and recovered.

W. Y.

FORBES (J.). **Treatment of Blackwater Fever.**—*Kenya & East African Med. Jl.* 1929. Sept. Vol. 6. No. 6. pp. 152–157.

The author recommends in the treatment of blackwater fever the use of MacLean's powders, viz. :—

Sod. Bicarb.	...	...	...	...	2½ ozs.
Calc. Carb.	...	...	...	...	5 ozs.
Mag. Carb. Pond.	...	...	...	...	5 ozs.
Bismuthi Oxy. Carb.	...	...	...	...	10 drs.

He gives one flat teaspoonful every two hours in water from 6 a.m. to 10 p.m. when a double dose is given.

W. Y.

SHIRCORE (J. O.). **Metabolism in Blackwater Fever.** [Correspondence.]—*Lancet.* 1930. July 12. pp. 106–107.

As a result of his meditations on Donald HUNTER's Goulstonian Lecture on the Significance to Clinical Medicine of Studies in Calcium and Phosphorus Metabolism, Shircore has reached the conclusion that it might be worth investigating the question of phosphorus metabolism and the influence of phosphatase in blackwater fever. He proceeds to elaborate an hypothesis to explain the disease without unfortunately producing any definite facts to support it.

W. Y.

NAZARIANE (A. D.). Sur un cas de fièvre bilieuse hémoglobininurique. [**A Case of Blackwater Fever.**]—*Russian Jl. Trop. Med.* 1929. Vol. 7. No. 5. pp. 315–317. With 1 chart in text. [In Russian. French summary]

A description is given of a case of blackwater. The summary contains nothing worthy of note.

W. Y.

MATHIEU (H.). Notes sur la fièvre bilieuse hémoglobininurique à Luang-Prabang (Laos). [**Notes on Blackwater Fever in Laos.**]—*Bull. Soc. Méd.-Chirurg. Indochine.* 1930. Apr. Vol. 8. No. 4. pp. 297–303. With 1 chart in text.

Cases of blackwater fever are met with at Luang-Prabang in small numbers throughout the year. Of the 27 cases seen during 1929 seven died. The article concludes with some remarks on treatment.

W. Y.

MAKFL (H. P.) & GILDER (Wayne). **Blackwater Fever.**—*Milit. Surgeon.* 1930. Aug. Vol. 67. No. 2. pp. 156–164. [6 refs.]

After giving a general account of the disease, the authors describe in four cases which have come under their care. The paper contains new.

W. Y.

- WAKEMAN (A. M.) & MORRELL (C. A.). **The Blood and Urine in a Mild Case of Blackwater Fever.**—*West African Med. Jl.* Lagos. 1929. July. Vol. 3. No. 1. pp. 6-7. [3 refs.] [Internat. Health Division, Rockefeller Foundation, Lagos.]

A clinical account is given of a mild case of blackwater fever, accompanied by details, in a tabular form, of examinations of the blood and urine.

W. Y.

- CARMODY (Ernest P.). **Blackwater Fever.**—*Jl. Med. Assoc. South Africa.* 1929. July 27. Vol. 3. No. 14. pp. 389-390.

A brief summary is given of the symptoms, complications and treatment of 70 cases of blackwater fever occurring in Mashonaland, Southern Rhodesia, between March, 1921, and April, 1927.

W. Y.

- STEPHENS (J. W. W.). **The Distribution of Blackwater Fever in North America.**—*Ann. Trop. Med. & Parasit.* 1929. Dec. 31. Vol. 23. No. 4. pp. 451-481. With 2 maps. [4 pages of refs.]

This paper is simply a record of cases of blackwater which have occurred in different parts of Northern America. An extensive bibliography is given.

W. Y.

- ALAIN. Observation de fièvre bilieuse hémoglobininurique.—*Ann. de Méd. et de Pharm. Colon.* 1930. Jan.-Feb.-Mar. Vol. 28. No. 1. pp. 90-92.

- DE BAUDRE. Syndrome de fièvre bilieuse hémoglobininurique.—*Ann. de Méd. et de Pharm. Colon.* 1929. July-Aug.-Sept. Vol. 27. No. 3. pp. 465-468.

- BIDDAU (Igino). Febbre ittero-emoglobinurica e plasmochina —*Riv. di Malarologia.* 1930. Jan.-Feb. Vol. 9 No. 1. pp. 53-60. With 1 chart in text. [English summary (6 lines) p. 95.]

- GOURMELON. Observation de fièvre bilieuse hémoglobininurique.—*Ann. de Méd. et de Pharm. Colon.* 1929. July-Aug.-Sept. Vol. 27. No. 3 pp. 463-465.

- LE COUSSE. Un cas de fièvre bilieuse hémoglobininurique —*Ann. de Méd. et de Pharm. Colon.* 1930. Jan.-Feb.-Mar. Vol. 28. No 1. pp. 93-94.

- MIRRA (Guido). La febbre biliosa-emoglobinurica tra gli indigeni della Somalia —*Arch. Ital. Sci. Med. Colon.* 1930 Jan. 1. Vol. 11. No. 1. pp 24-27. [10 refs.] English summary (1 line) p 28.

- NAIR (K. G.) & RAJU (S). A Case of Blackwater Fever.—*Indian Med. Gaz.* 1930. Jan. Vol. 65. No. 1. p 16.

- SCOTT (G. Waugh). Blackwater Fever in Malaya.—*Malayan Med. Jl.* 1929. Sept. Vol. 4. No. 3. pp. 83-85.

MISCELLANEOUS.

CLELAND (J. Burton). **Disease amongst the Australian Aborigines.**—*Jl. Trop. Med. & Hyg.* 1928. Vol. 31. pp. 53-59; 65-70; 125-130; 141-145; 157-160; 173-177; 196-198; 202-206; 216-220; 232-235; 262-266; 281-282; 290-294; 307-313; 326-330. [74 refs.]

This series of articles touches only incidentally the subjects which usually form the matter of this *Bulletin*. The author points out that the pure-blooded Australian aborigine is fast dying out, so that it seemed advisable to collect all possible information about his diseases, and how he reacts to them. He has had recourse to official records and acknowledges assistance from a large number of people; the list of references (page 235) cannot fail to be of value. A conspectus of the ground covered is given on the first page. The later sections are devoted to epilepsy and insanity.

A. G. B.

LAMBERT (J. M.). **First Annual Report of the Western Pacific Health Service.**—*Fiji Ann. Med. & Health Rep. for Year 1928.* pp. 74-86. With 11 figs. on 4 plates & 6 plans.

The Western Pacific Health Service operates in Fiji, Gilberts and Ellices, British Solomons and the New Hebrides Condominium. It is concerned with hookworm disease and soil sanitation, yaws treatment and, in the case of Fiji, with treatments for ringworm. The Service is directed by the Rockefeller Foundation Director for the South Pacific who serves under the Chief Medical Officer for Fiji. The headquarters is in Suva, Fiji. The distance between the islands and the poor communications render the work difficult. The Central Medical School at Suva, with which also the W. P. Health Service is concerned has 40 students, from all the islands of the Service as well as from Western Samoa, Tonga and Cook Islands. The Suva War Memorial Hospital, to which the School has access, has over 100 beds. The course is at present 3 years. This new school, an extension of the old, is expected to have a profound effect on the health of the Pacific Island races. Fiji now has 47 native practitioners; owing to their isolation, many are rarely inspected; a Travelling M.O.H. has now been appointed to visit them.

Campaigns against yaws and ringworm in Fiji and yaws and hookworm in the Ellices and British Solomons were begun in January, 1928. Yaws and hookworm are the largest factors of preventable disease. Mass attacks on their incidence should so reduce them that the gain can be held by the native practitioners. Discussing treatment by carbon tetrachloride the author says he has never seen a case of poisoning among Tongans, Samoans, Raratongans, Fijians or Solomon Islanders; the trouble has always been amongst Indians usually with massive roundworm infection. LAMSON's work suggests that the Indian diet is low in calcium, while that of the Fijians, etc., is richer [this *Bulletin*, Vol. 25, p. 469]. 20,153 hookworm treatments were given in the year.

Yaws is the greatest cause of morbidity in S. Pacific populations, probably the greatest cause of infant mortality. About 50 to 100 per cent. of any population shows symptoms at any time. In others

the disease is quiescent and they, it is believed, keep it alive when the active cases are treated. The author agrees with others that Pacific Island yaws gives immunity to syphilis. A survey was made of Rotumah, an isolated compact island with an accessible population of 2,400. A yaws history was obtained of every youth, and the results are tabulated. The table shows that after the age of four years and up to seventeen, all the children are infected though a number varying from 13 to 68 per cent. at different ages show no signs. "The best hope of eradicating yaws is to give mass treatments to all youths of Pacific Islands to the age of 17." The author advocates neo-arsphenamine which can be bought at one penny per decigram. Three doses were at first given; but later two were believed to be equally effective. 17,020 had first treatment, a total of 42,447 injections.

Ringworm affects large percentages of the population of Fiji. The yaws unit tested the efficacy of a saturated solution of salicylic acid in strong tincture of iodine, painted on the surface of the body, face and shaven scalp; not more than half to one-third of the body at one time and another section done in two days. 307 persons treated at a first survey were examined 6 months later; 169 were cured. In many of the rest the infection was reduced to patches. The disease is not very contagious; records of 38 couples married for many years showed only 7 instances in which both were infected.

A. G. B.

INDIA. **Annual Report of the Public Health Commissioner with the Government of India for 1927. Volume II.**—pp. ii+217. 1929. Calcutta: Govt. of India Central Publication Branch. [Rs. 2-4 or 4s. 3d.]

This volume deals with the health of the British Troops in India and the health of the Indian Army.

British Troops.—The average strength of officers and other ranks was 2,476 and 55,362. The chief causes of sickness were:—

	Officers.	Men.
Malaria	168	7,723
Bronchitis	101	891
Inflammation of Areolar Tissue	99	1,755
Tonsillitis	99	1,632
Diarrhoea	95	922
Sand-fly fever	81	1,429
Dysentery	48	877
Venereal disease	—	3,160

("Inflammation of areolar tissue" was chiefly due to bites of mosquitoes and sandflies). There were 149 deaths among the men, 2·68 per mille of strength, the lowest death rate ever recorded.

The principal causes of invaliding to the United Kingdom were:—

Inflammation of middle ear	155
Pulmonary tuberculosis	73
Mental diseases	67
Epilepsy	46
Disordered action of the heart	40
Perforation of Membrana Tympani	32
Valvular disease of the heart	32
Neurasthenia	27
Malaria	20

[The prominent position in this list occupied by "inflammation of middle ear" (to which may probably be added the 32 "perforations of membrana tympani") may be due to the "tonsillitis" which is well up among the admission rates. Its origin is not discussed, but it headed the lists also in the two antecedent reports.]

Under dysentery we learn that "the change-over from amoebic to bacillary dysentery" is still going on, "the result of improved diagnosis."

	1924.	1925.	1926.	1927.
Amoebic dysentery	599	498	230	194
Bacillary dysentery	32	85	303	259
Group dysentery	38	142	359	424
Total	669	725	892	877

Out of a total of 34,666 admissions from all causes, 7,723 or nearly one-quarter were for malaria, showing a decrease of 1,666 cases on 1926. The decrease is largely due to energetic antimalarial measures, the most effective being "cold storage (withdrawal from malarious stations to the hills) and mosquito proofing." Other measures are fumigation of barracks (of great value), propaganda by film, anti-mosquito breeding measures, and mosquito nets. It is stated that "a still further decline in the incidence of malaria at Lahore has followed the mosquito proofing in 1925" of British barracks and hospital, thus:—

	Per 1,000.
1924	1,038.4
1925	706.2
1926	613.5
1927	255.3

Indian Army.—The principal causes of admissions to hospital were:—

Malaria	13,111
Minor septic diseases	3,634
Bronchitis	2,302
*Venereal disease	2,070
Dysentery	1,543
Pharyngitis	1,519
Diarrhoea	1,431
Pneumonia (lobar and lobular)	1,367
Influenza	1,220
Sand fly fever	1,006
Conjunctivitis	941
Tonsillitis	535

The main causes of death were:—

Pneumonia	190
Injuries	78
Influenza	18
Malaria	17
Pulmonary tuberculosis	15
Dysentery	11

and the chief causes of invaliding:—

Pulmonary tuberculosis	343
Injuries	149
Diseases of ear and nose	136
Diseases of the eye	101

* Gonorrhoea 1,010, syphilis 677, soft chancre 383.

It is suggested that the provision of mattresses would tend to diminish the incidence of bronchitis.

Malaria caused 3,111 admissions or 27·2 per cent. of the total. Its incidence has shown a steady fall since 1920, which may be partly due to a series of favourable seasons.

Pneumonia accounted for 1,367 admissions, and 190 deaths. A table shows a steady improvement since 1920, the ratio of admissions per 1,000 being then 17·4 and now 10·3, and the ratio of deaths 3·85 and 1·43 respectively. "The improvement may fairly be ascribed to the steadily improving conditions under which the Indian sepoy is housed."

The figures for pulmonary tuberculosis have similarly improved, but the loss by invaliding is great.

A. G. B.

VON KÜHLEWEIN (M.). **Report of a Journey to Upper Mahakam (Borneo), February-May, 1929.**—*Meded. Dienst d. Volksgezondheid in Nederl.-Indië*. 1930. Vol. 19. Pt. 1. pp. 66-152. With 10 maps, 22 diagrams (3 coloured), 1 text fig. & 19 figs. on 10 plates.

In consequence of a report that the Dajak population in the sub-division Upper Mahakam (Borneo) was steadily decreasing the author was sent there in 1929 to investigate the hygienic conditions and to discover the reasons for increased mortality if such existed. In this long paper abounding in maps, photographs, diagrams and tables he gives the results of his enquiries. The area is one of 21,000 sq. kilos, and the population at the last census was 8,561; the district is therefore lightly peopled. Almost the whole division is covered with dense primeval forest, and the people live on the banks of the Mahakam, a river "as long as the Rhine". The housing, food, sex life, religion are described in turn. Of the inhabitants, 89 per cent. presented themselves for examination. The following were the medical observations:—

Malaria is endemic in a benign chronic form. There is no malarial anaemia. All three parasites were found. *A. leucosphyrus* and *A. umbrosus* are the probable vectors. Yaws and hookworm infection are slight. Dysentery is believed to be common and to influence unfavourably the infantile mortality. Goitre is widely spread. Leprosy and tuberculosis are sporadic and unimportant. Tinea imbricata is very common. There is a small amount of trachoma. Syphilis was not seen. Gonorrhoea was found in one district, but in no great prevalence. Blindness in consequence of gonorrhoea is rare. Smallpox is absent, but the people are well vaccinated. His general conclusions (abridged) are as follows:—

"The Dajak population of the sub-division Upper Mahakam decreased in number during the period 1918-1927. After that an increase took place. The decline of the population should be ascribed (1) to serious epidemics of influenza and of dysentery before 1927; and (2) to an unfavourable biological condition.

"The health conditions in general are since 1927 not unfavourable. For a tropical country they appeared to be even satisfactory during the period of the investigation.

"The unfavourable biological condition is due to: (1) shifting of the sex-proportion in favour of the male sex; (2) the great number of sterile women, the sterility being not due to disease; (3) the great number of women having given birth to only one child, without this being due to disease.

(4) the low number of births, not to be ascribed to disease; (5) the still lower absolute upgrowth-figure.*

"Nothing can be done against the decline in consequence of the unfavourable biological condition, nor will marriages of Dajak women with Malay men be of any help.

"In order to retard as much as possible the rate of the inevitable decline it is necessary: (1) to prevent the appearance of new epidemics, by improvement of the existing very unfavourable hygienic conditions, together with other prophylactic measures; (2) to station a physician in Upper Mahakam for combating diseases, for carrying out the above mentioned improvements and for starting an intensive public health education of the people; (3) to double at least the number of existing schools, in order to teach the people the principles of hygiene and to carry them on a higher level of civilisation."

A. G. B.

STRAUB (M.). Kindersterfte als biologisch verschijnsel en het bevolkings-vraagstuk ter Oostkust van Sumatra. [**Infant Mortality as a Biological Phenomenon and the Population Problem on the East Coast of Sumatra.**—*Geneesk. Tijdschr. v. Nederl.-Indië*. 1930. Jan. 1. Vol. 70. No. 1. pp. 3-46. With 4 text figs. [Refs. in footnotes.]

In his previous attempt to explain and combat the high infant mortality in the Javanese labourers' families on the East Coast of Sumatra (see *Bulletin of Hygiene*, Vol. 3, p. 921) the author came to the conclusion that, apart from exogenous influences on this mortality rate, there exists a certain inferiority of resistance of the Javanese child against various diseases, which for example, finds its expression in its extraordinary inclination to FINKELSTEIN'S intoxication†. As the cause of this congenital inferiority he considered the comparatively low physical condition of the mothers, especially in regard to the vitamin content of their diet. Infant mortality was highest where the average weight of the newborn Javanese child was low. During the first year of life the mortality was lower in children of mothers who had received antenatal hospital attendance.

Founding his views upon PEARL'S studies (Studies in human biology; The biology of death; The biology of population growth) Straub makes a comparison between the prodigal way of breeding (high birth rate with high infant mortality) and the economic way (low birth rate, but still lower infant mortality). Along both paths growth of the population may be expected and both ways are governed by biological influences, which are discussed at some length in a way which cannot be summarized here.

Notwithstanding the prodigal way of breeding prevailing at present in the coolie population on the East Coast of Sumatra, the conditions are given for a satisfactory growth; it constitutes a good "germinating centre." This conclusion is of much importance for the future of the

* By upgrowth is meant the total of children that have attained the age of 15 years.

† The most important cause of death during the first three months of life is an anhydraemia, the toxic symptom-complex of Finkelstein, which, in European experience, is usually only seen in hand-fed infants. In some cases there was a parenteral infection, but in many no discoverable factor. Thus, of 92 deaths of children under three months of age investigated in the Medan hospitals 1925-27, many as 36 were referred to anhydraemia without objective cause. (*Bulletin of Hygiene*, 1928, v. 3, 922.)

agricultural companies in Sumatra, whose aim should be to obtain by immigration a settled Javanese population, from which they can recruit their labourers.

The high infant mortality rate is a biological phenomenon, which is not to be combated by individual care of the babies, but which will be influenced favourably by general biological, hygienic, social and economic factors acting on the population as a whole. "Child mortality is one of the elements influencing the growth of populations. The latter as such, however, is determined chiefly by the available sources of prosperity, not by medicine or hygiene."

W. J. Bais.

SURBEK (K. E.). Aus 10 Jahren Tropenpraxis. [**Ten Years Practice in the Tropics.**]—*Schweiz. Med. Woch.* 1930. Aug. 16. No. 33. pp. 778-781.

The tropics here is Sumatra, of whose diseases a discursive account is given without numerical data. The author makes a short reference to "Quartana Nephrosis infantum" defined as a subacute nephrosis causing deep oedema, attacking children and adolescents, and caused by quartan malaria. It appears that bronchial asthma is a common affection among Malays and Javanese. It is ten times as frequent in men as in women. The Malays suffer also from bradycardia, low blood pressure and a plasticity of skeletal muscles, evidenced by local contraction lasting half a minute after pinching or similar stimulation.

A. G. B.

FOUND (Norman). **Laboratory Work in Korean Mission Hospitals.**—*China Med. Jl.* 1930. July. Vol. 44. No. 7. pp. 675-678. [4 refs.]

The author, who is in charge of the Department of Pathology, Severance Union Medical College, made enquiries about the laboratory work done in ten mission institutions outside Seoul and tabulates it for five laboratories. He makes the following observations: Lung disease due to tubercle and "distoma" is widely distributed. 4-5 per cent. of the people are tuberculous. Diphtheria is very prevalent in the capital, malaria rare (19 cases in a year). In Seoul Trichuris infestation is almost universal. Ascaris in all parts of the country infests 38-62 per cent. Hookworm is common, 45 per cent. at Seoul, but out of 215 hookworm-containing stools only 19 harboured more than 10 worms (counts on hospitalized patients). *Trichostrongylus orientalis* is also very common and possibly is confused with hookworm [see this *Bulletin*, Vol. 27, p. 439.]

A. G. B.

BESSON (Andrée). Le centenaire de l'Algérie au point de vue de la médecine de l'assistance et de l'hygiène. [**The Centenary of Algeria in respect of Medicine, Public Assistance and Hygiene.**]—*Ann. d'Hyg. Pub. Indust. & Sociale.* 1930. May. Vol. 8. No. 5. pp. 265-287. [Refs. in footnotes.]

In this year (1930) France is celebrating the centenary of Algeria, and the present article gives an account of the advances made there in medical science and its applications. Sections deal with: (1) Algeria before 1830; (2) the French conquest; (3) the difficulties of colonization.

tion up to 1870 ; and (4) colonization from 1870 to 1900, and in the present century. A picture is given of pre-conquest Algeria by the quoted statement—Where there is no water one dies of thirst : where there is water one dies of fever. We are told that MAILLOT by the use of sulphate of quinine, recently discovered, improved greatly the health of the army of occupation and enabled it to complete its task. A few figures from the vital statistics of Boufarik in the 40's give an idea of the difficulties of the first colonists.

The two important scientific events between 1870 and 1900 were the discovery by LAVERAN of the microscopic agent of malaria, 1880 [given by error as 1860] and the foundation in 1894 of the Pasteur Institute of Algeria. In 1900 the Institute organized a mission for the study of malaria, named in 1904 the Algerian antimalarial service, of the activities of which many accounts have appeared in this *Bulletin*. A description is given of the work of the Institute [with this questionable statement of infantile leishmaniasis : " l'on découvrit qu'elle est due à la transmission de l'infection canine par les puces."] The advances in knowledge of the various diseases are described. The results are summed up in the statement that the mortality of the Europeans, which was 28 per mille in 1890, had fallen in 1910 to 17 per mille [later figures are not given]. The European birth rate is given as 24 per mille.

A. G. B.

ATKEY (O. F. H.). **Sanitary Problems in the Gezira Irrigated Area.**—*Kenya & East African Med. Jl.* 1930. June. Vol. 7. No. 3. pp. 61-77.

The Gezira plain is bounded on the east and west by the Blue and White Niles which converge to the north till they join at Khartoum ; southward the railway between Sennar and Kosti may be considered the boundary. It comprises an area of 5 million acres and the part under irrigation is half a million acres. The plain is almost level so that drainage is difficult ; the soil is loam and clay which holds up the water, making transport very difficult at the height of the rains. The rains fall from the beginning of July to the end of September ; malaria becomes epidemic in August and dies down in the non-irrigated area in November-December. The original population was mainly Arab, and was almost entirely dependent on the dura grown during the rains. If the rains were good, malaria was severe and the crop was difficult to get in. The pasturage was so scanty that there was little livestock. Milk was scarce and meat rarely eaten. Green food was absent except in the rains when milk and green food became available. The villagers were under-nourished, and of poor physique. The settled Arab population appears to be now about 70,000 ; the immigrant natives number about 42,000 ; these are difficult to control, having no tribal organization and a low standard of life. The change in social conditions since irrigation was started is very great. The dietary is now liberal and varied, milk is plentiful, meat generally eaten, tea and sugar consumed in large quantities, houses improved.

An account is given of the irrigation scheme. The land was taken over from the tenants who receive 40 per cent. of the profits and provide the labour. The cotton crop is sown in July and is watered some 14 times between this and April 15th. The interval, 15 days, allows of the complete drying off of the field channels, " the most essential antimalaria measure during the dry season."

The sanitary organization of the irrigated area is described. It is divided into blocks averaging from 15,000 to 22,000 acres, each block being under a Block Inspector who is responsible for seeing that routine antimalarial measures are carried out. The Medical Inspector's work is confined to inspecting, reporting and emergency oiling. Every tenant and labourer is within easy reach of a dispensary where he can obtain free treatment for himself and family.

Malaria.—The Gezira has always been subject to epidemic malaria in the rains owing to its flatness, want of natural drainage and impermeability of soil. These seasonal epidemics are affected by irrigation both for good and bad in ways described. They are dealt with by distribution of quinine, and of mosquito-nets (against payment), anti-larval measures when the country dries up, mosquito-proofing of houses of officials, establishment of surface drainage (commenced); the last is the essential factor.

Previous to irrigation there was no transmission of malaria after the end of the year; now malarial infection, unless it is prevented, is continuous. During the dry season it is sought to keep the irrigated area mosquito-free by: (1) careful drying out of the field channels between waterings; (2) cleaning to keep them free of weeds; (3) prevention of seepage; (4) prompt treatment of malarial cases. The essential in the control of dry season malaria is the establishment of a system of drains to drain off promptly the excess of water in the rainy season. The author states that increased prosperity of the people and liberal distribution of quinine have not proved sufficient to prevent the serious disabling effects of malaria. Antimosquito measures are essential.

Bilharziasis. Before irrigation this was practically an uninfected area, but it was seen that the introduction of infected snails would lead to a serious position. The measures taken to safeguard the irrigated area were: (1) quarantine at Wadi Halfa, and on the White Nile of labour imported from Egypt and Kordofan; (2) antibilharzial work in the endemic areas of the Sudan; (3) prevention of bathing and passage of excreta in the irrigated area; (4) propaganda; (5) destruction of snails in the non-watering period; (6) treatment of all infected cases. These measures are discussed. The non-watering period lasts from mid April to mid July. During this about half the canals are dried and dug out for irrigation purposes; the remainder are partly emptied and sizolin is added to form a mixture of 1 in 20,000; after 48 hours the snails cannot be revived; the water remains drinkable. The examination of large numbers of natives in 1926 and 1928 shows that infection is present—in 1928, 37 children from 22 villages were infected—but it appears that the measures taken are reasonably effective.

There has been no trouble with hookworm or kala azar.

A. G. B.

MCCARTHY (D. D.). *Medical Notes from Weti, Pemba.*—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1930. Jan. 30. Vol. 23. No. 4. pp. 401–412.

Pemba, the second island of the Zanzibar Protectorate, is described with a brief account of the climate; the Weti district is the northern third.

Ankylostomiasis. Clinical ankylostomiasis is recognized by the usual symptoms combined with the presence of ova in the stools. It was noticed that some patients responded promptly to oil of chenopodium;

while others did not. An estimate was therefore made, by Stoll's method, of the number of ova per gm. and it was found that with up to 5,000 ova per gm. symptoms were absent, whereas with symptoms present the excretion was on the average 10,000 ova per gm. Of a series of anaemic patients those with heavy ova infection were given full hospital diet, an iron and arsenic tonic, and oil of chenopodium, 3 doses at weekly intervals; those with light infections received only the hospital diet, supplemented by eggs, milk, green vegetables, fruit and marmite. The total number (30) was too small for definite results, but in the author's belief clinical ankylostomiasis in Pemba is due only in part to the disease and in part to some other factor, which may be a deficient diet.

Malaria is a common disease, ranking with filariasis and ankylostomiasis. Of 58 town children, 19 showed parasites, and of 18 country children 7. *A. costalis* was the common anopheline in houses; *A. funestus* and *A. maculipennis* was also found.

Rats and Fleas. Rats were caught in godowns, clove sheds and bakeries, a few only in houses. Of 176, 20 were *Epimys norvegicus* and 156 *Rattus rattus*. Of 571 fleas all but one *Xenopsylla cheopis* were *X. braziliensis*. The author notes that in Zanzibar *cheopis* constitutes over half the total number of rat fleas.

Schistosomiasis. Of 127 persons, without symptoms, examined, 46 showed ova of *S. haematobium*. In 19 over the age of 35 years, the frequency fell off. A systematic search was made for the molluscan host. A species of *Isadora* occurred in shallow marshy pools, generally on the under side of the leaves of a water lily; in 390 dissections of these 7 (or 1.79 per cent.) showed cercariae. The author notes the wide prevalence of the disease, the rarity of complaint, and the apparent loss of the infection with advancing years. He believes that any attempts at mass treatment would be futile, and attack on the snail costly and probably useless, and advises propaganda—popular lectures and demonstrations by trained natives.

Filariasis. Of 156 night blood films from adults 35 showed microfilariae; and a rather smaller proportion from children averaging 9 years [but the blood was taken at 7.30 p.m.]. Cases of clinical filariasis and elephantiasis are comparatively uncommon [no figures given]. Dissection of *Culex*, *Aedes* and *Anopheles* spp. showed positives in all, chiefly in *Culex* (apparently *fatigans*). A few details are given of *Ascaris* and *Trichuris* infestations, the former in 15 of 76 children, the latter "almost universal." [A much more informative paper than one usually finds under the heading Medical Notes.]

A. G. B.

CROVERI (Paolo). Contributo alla conoscenza della nosografia umana ed animale della Somalia Italiana. (Specialmente nella zona di Merca.) [**Disease in Man and Animals in Italian Somaliland, particularly in the Merca District.**]—*Arch. Ital. Sci. Med. Colon.* 1930. Mar. 1. Vol. 11. No. 3. pp. 129–155. English summary (3 lines) p. 156. [Inst. of Trop. Path., Univ., Bologna.]

The author gives a brief account—it amounts to little more than a catalogue—of the chief human and veterinary conditions met with.

¹He divides the report into six parts. Of protozoal diseases he mentions malarial fever and relapsing fever which are very common; yaws he has not

seen. All three species of malaria parasite occur ; in the cases observed there were 43.9 per cent. *Pl. vivax*, 29.3 per cent., *Pl. falciparum*, and 26.8 per cent. *Pl. malariae*. Human trypanosomiasis does not occur, *Glossina palpalis* and *G. morsitans* are absent, all the tsetse found being *G. pallidipes*. Five forms of pathogenic trypanosomes are met with : *T. congolense*, *T. brucei*, *T. pecorum*, *T. evansi* (in dromedaries particularly) and *T. vivax*. Part II refers to bacterial infections. During the five years he was at Merca, the author saw no cases of human tuberculosis, and bovine was very rare. There are a few cases of leprosy. He never met with a case of typhoid fever. The rest may be briefly summarized. Two cases of mycetoma and a few of Trichophyton ; *Sch. haematobium*, *T. saginata* and *H. nana* in man, *Filaria papillosa* in the horse, *F. immitis* in the dog are the chief helminthic infestations. Hookworm is not mentioned. Finally, of deficiency diseases one case of dry beriberi was seen.

H. H. S.

FREYD (Alexandre). Pathologie d'Amazonie peruvienne. [**Pathology of the Peruvian Amazon.**].—*Rev. Méd. et Hyg. Trop.* 1930. July-Aug. Vol. 22. No. 4. pp. 145-188. With 16 figs. (3 maps). [1 ref.]

At the invitation of the government of Peru the Polish government sent a mission to study the climatic and economic conditions of a tract in the Ucayali basin thought to be suitable for Polish emigration. The author was the medical member. The mission went up the Amazon to Iquitos, where it remained for a month, and then in a motor traversed the length of the Ucayali river (2,000 kilos). The author then went up the Tambo river, a tributary of the Ucayali, by canoe, crossed the Andes to the coast and so home after an absence of 7 months. He brought back some hundreds of blood smears which were examined at the Institut de Médecine Coloniale in Paris. The diseases met with are considered in turn, but few numerical data are given.

Yaws was recognized for the first time in Peru by ESCOMEL in 1912. Now, along the rivers named, this disease with hookworm forms the greatest plague of the population ; 80 per cent. of yaws patients are children and adolescents. Iquitos is the chief centre. The author found novarsenobenzol promptly effective ; the action of bismuth was slow and mercurial salts were useless.

Parasites of the Alimentary Canal. Of 130 stool examinations, one only was negative for ankylostomes. Other common helminth eggs were also met with and probably larvae of Strongyloides.

Malaria. Certain places mainly on the Lower Ucayali were attacked ; others on the upper river, where the concession lies, were free. The parasite found was almost invariably *P. vivax*, but *P. falciparum* was found in soldiers who came from the frontier of Ecuador. Of 832 adult spleens palpated 81 were enlarged, and of 416 in children under eight 56 (=13 per cent.).

Leprosy. Leprosy was noted in Peru, in Brazilian immigrants, 30 years ago. There are believed to be 400 lepers in this part of Peru, but not it is stated, in the future Polish concession ; only 46 are interned.

Amoebic dysentery. Under this heading it is stated that periodical attacks decimate the population [but no mention is made of finding of entamoebae.]

Beriberi. Cases were seen at Iquitos.

Leishmaniasis. The American form is met with fairly frequently. The parasite was thrice identified in recent ulcers. The author notes that the word "uta" means a chronic ulcer of the skin and "espundia" a similar ulcer of the mucosa. Under these designations there were brought to him cases of leishmaniasis, phagedenic ulcer and ulcers of yaws, leprosy and syphilis.

Carate. Parasitic skin diseases were common. The information is too generalized for summary.

Other matter touched on are pterygium which in some villages affects 10-25 per cent., mountain sickness (soroché), jigger flea, harvest bug and vampire bats, which on the Tambo drive the natives to their mosquito nets.

In the conclusions it is stated that the infectious diseases are all on the lower Ucayali river, and that almost all diseased patients seen in the concession came from there. It will therefore be necessary to restrict communication with the lower river, and to draw labour exclusively from the upper reaches. The future route to the concession will be by road across the Andes, but for the present, the Amazon must be used.

[It may be suggested that malaria is likely to be the chief hygienic obstacle to the success of Polish colonization of this region and that it might be wise to make further enquiry into distribution of malaria and anopheles].

A. G. B.

GANORA (Romualdo). Notizie sulla climatologia e nosografia dello Yemen (Arabia Felice) e su di un'epidemia di febbre ricorrente. [**Climate and Disease in Yemen. An Epidemic of Relapsing Fever.**] —*Arch. Ital. Sci. Med. Colon.* 1930. Aug. 1. Vol. 11. No. 8. pp. 475-479. English summary (3 lines).

In Yemen generally malaria, enteric and smallpox occur, and in Tehama malignant tertian is common and also amoebic dysentery and undulant fever [no figures are stated]; leprosy is also met with and eye diseases are common, nearly half being trachoma. In Sana there was an epidemic of relapsing fever in the last three months of 1929, and in many of the lice examined, spirochaetes were found by Professor FRANCHINI. Some 500 patients received hospital treatment; the fatality rate was high, 25 per cent.

H. H. S.

COOK (Cecil). **The White Settler in Tropical Australia.**—*Jl. Med. Assoc. South Africa.* 1930. Apr. 26. Vol. 4. No. 8. pp. 228-230.

The author is of opinion that too much importance has been attached to standards of temperature and humidity based upon experiments under special conditions as criteria of open air working conditions in the tropics. He cites some observations leading to the conclusion that strenuous work could be safely carried out under atmospheric conditions which, judged by the conventional standards, would be very bad. Evidence is adduced that neither in respect of infant mortality nor of death at birth did the experience of the North Australian Medical

Service suggest "any real basis for the common belief that tropical climatic conditions adversely affect mother and child." He thinks that the general mortality rate is favourable. [As, however, the data are very scanty and the age distribution of adults over 20 is not provided, statistical inferences cannot be deemed trustworthy.] At the same time, numerous hygienic problems remain to be solved. Ankylostomiasis, filariasis and leprosy introduced into tropical Queensland by the importation of coloured labourers have become endemic and are a source of morbidity and expense. The full-time medical service introduced in 1928 is now at work, and the activities of the service are briefly described.

M. Greenwood.

LING (W. P.). **Ocular Findings in Some Infectious Diseases (Typhus, Typhoid, Dysentery, Kala-Azar, and Pellagra) : a Critical Review of the Literature and Some Observations among the Chinese.**—*Nat. Med. J. China*. 1929. Oct. Vol. 15. No. 5. pp. 632-684. [183 refs.] [Peiping Union Med. College, Peking.]

A comprehensive account of its subject which, with its numerous references arranged under diseases, cannot fail to be useful. The first 26 pages are occupied with the "literature," the rest with the findings at Peiping and conclusions. The following extract seems worth reproduction.

"If possible, in all cases where the question of an etiological relationship between an ocular and a general disease is involved, emphasis should be laid on demonstrating the presence of the causative agent or its toxin in the eye. For example, if ameba is suspected as the cause of an ocular lesion, the claim is not acceptable until the organism can be shown in the eye with the proof that its presence is not by accident. In cases of conjunctival diseases of infectious nature the organism must be found not in the discharge, but in the living epithelial cells of the lid and bulbar conjunctiva. This is absolutely necessary in view of the discovery of LINDNER (*Arch. f. Ophth.*, 1921, 105, 726) who has convincingly shown that in conjunctival inflammations of infectious nature only those organisms which are found in the living epithelial cells are of importance from the standpoint of pathogenicity. Those organisms which are found in the dead cells and in the secretion are saprophytes and are insignificant from the standpoint of pathogenicity.

"It is further necessary, especially in intraocular inflammations, to demonstrate the presence of the causative agent in the blood circulation during the appearance of the complication. For example, if typhoid bacilli are blamed for producing a particular uveal tract disease the etiological question can hardly be answered until the organism or its toxin can be found in the local lesions, and in the circulating blood.

"Again, many other etiological factors must be excluded which may equally well account for the ocular disease in question. In a country like China, it is especially necessary to exclude two widespread diseases, namely, tuberculosis and syphilis.

"If due consideration is not given to all these important factors, any cases studied are of little value.

"In animal experiments the same kind of caution is necessary.

"Finally in all cases the question should be considered as to how far acute infectious diseases are instrumental in the 'flaring up' of an old chronic general infectious disease which can thereby attack the eye. Unless we understand this possibility and bear it in mind, wrong conclusions may be made."

A. G. B.

WHITE (J. Duncan). **Bone Lesions in Tropical Diseases.**—*Proc. Roy. Soc. Med.* 1929. Oct. Vol. 22. No. 12. pp. 1541–1546 (Sect. Electro-Therap. pp. 43–48). With 6 text figs. [4 refs.]

An address by the radiologist of the Tropical Diseases Hospital, London. He refers to the bone lesions in yaws and goundou, big heel, ainhum, leprosy, and gives skiagrams of some of these conditions.

A. G. B.

KANAGARAYER (K.). **Some Observations on Differential Diagnosis in the Tropics.**—*Malayan Med. Jl.* 1930. Mar. Vol. 5. No. 1. pp. 36–38.

A clinical paper worth perusal. The diseases discussed are, malaria, fevers of enteric group and of dengue group, leptospiral fevers, tropical typhus, funiculitis, dysentery and diarrhoea and, shortly, visceral abscesses and helminthiasis.

A. G. B.

DAUKES (S. H.). **The Interrelationship between the Hygiene of Tropical and Temperate Climates.**—*Jl. Trop. Med. & Hyg.* 1930. Feb. 1. Vol. 33. No. 3. pp. 35–40. [26 refs.]

A most interesting account of this interrelationship. Since, however, it is the temperate hygienist who has to learn from the tropical rather than the reverse the paper loses in value by publication in a journal which will not be seen by the former.

A. G. B.

PIÉRY & MILHAUD. Indications et choix d'une cure climatique dans les maladies des pays chauds. [**Choice of a Climatic Cure in Tropical Diseases.**]—*Rev. Prat. Malad. des Pays Chauds.* 1930. Mar. Vol. 10. No. 3. pp. 103–106.

Brief discussion as to which of the numerous French spas is most suitable for patients from warm countries, who are classed under three heads.

A. G. B.

GABBI (U.) & MARIOTTI-BIANCHI. Per una scuola di patologia ed igiene coloniale a Roma. [**A School of Pathology and Colonial Hygiene at Rome.**]—*Giorn. di Clin. Med.* 1929. Oct. 30. Vol. 10. No. 15. pp. 1035–1036, 1039–1042, 1045–1046.

The authors, Vice-Presidents of the National Congress of the Italian Society of Tropical Medicine and Hygiene, put forward a plea for the establishment of a school on the lines of those of London, Liverpool, and elsewhere, for the study of tropical medicine, hygiene and allied subjects. After stating the subjects which would be taught, and the buildings necessary, including a hospital, they consider what would be the best locality and decide on Rome for the following reasons: That it is the chief centre of activity of the country, there is a University there and an Institute and laboratory of Hygiene and Preventive Medicine, a school for Malariology, the Rockefeller laboratory, and the fascist Colonial Institute.

H. H. S.

TAYLOR (K. P. A.). Cement-Starch Mixtures as a Substitute for Plaster of Paris in the Tropics.—*Eighteenth Ann. Rep. Med. Dept. United Fruit Company, Boston, Mass.* 1929. pp. 247-250. With 1 text fig. [3 refs.] [Chiriqui Land Co. Hosp., Puerto Armuelles, Panama.]

Unused plaster of Paris deteriorates rapidly in the moist tropics. The plaster becomes coarsely lumpy or mixed with hard irregular granules, which are unaffected by immersion. Some grades undergo this change without exposure. Certain French preparations of plaster marketed in 500 gram sealed tins are free from these objections, but import duties render them expensive. The author has found that mixtures of Portland cement with starch form an efficient substitute.

"For most purposes, a mixture of equal parts by volume of Portland cement and laundry starch will prove satisfactory. These materials are freshly mixed, triturated if lumpy, spread thickly on a gauze bandage, rubbed smooth, and loosely rolled. The bandages are placed in warm water (salt is omitted), gently compressed to insure exit of air bubbles, and applied exactly as are plaster bandages. Cement-starch powder and water are thoroughly rubbed into the growing cast. The finished model is smoothed and polished with starch-and-water paste. Casts for the arm or leg should be at least 1 cm. thick after rubbing; and for the body, thigh and hip, they should be proportionately heavier.

"For a light-weight cast, subjected to little strain, the mixture may be made of 2 parts by volume of starch to 1 part of Portland cement; while for a heavy weight cast, which may be subjected to considerable tension, the proportion may be reversed.

"These casts generally require from 24 to 36 hours to become thoroughly dry and hard. New types of quick-hardening cement materially reduce the time of 'setting.' During this period, immobility must be assured by co-operation of the patient. Drying may be hastened by the application of hotwater bottles to the cast, by exposure to sun or light, by hair-drying apparatus, or by utilizing one or more 200 c.p. electric bulbs."

The cement-starch cast is less expensive than the plaster cast.

A. G. B.

HARVEY (W. F.). Some Experiments on Radiant Energy as a Lethal Agent.—*Indian Jl. Med. Res.* 1929. Oct. Vol. 17. No. 2. pp. 507-517. With 6 figs. on 1 plate. [Central Research Inst., Kasauli, & Roy. College of Physicians, Edinburgh.] [Summary appears also in *Bulletin of Hygiene.*]

The author reports a number of investigations concerned with the utilization of sun heat for sterilization, and with problems of protection against heat stroke. The experiments were carried out at Kasauli, at an altitude of 6,000 feet.

Government meteorological data from Lahore have shown that the sun temperature there remains from April to September at about 70° C., a temperature lethal to micro-organisms, while the average shade temperature during this period is an incubation temperature for micro-organisms; the average shade temperature in May and June is higher than normal human body temperature. The author's experiments demonstrated that a maximum heating effect of the sun's rays occurred on a black surface, so that if the rays were utilized for the

sterilization of water, the storage tank should be of that colour, and conversely when protection from heating effects is desired, the tank should be white.

It was found that a suspension of typhoid bacilli became sterile within an hour after its exposure to a hot sun, during which time the temperature had reached 53° C. The practical significance of the experiment is apparent. The case of milk is less simple, for milk is an albuminous fluid and a good medium for bacterial growth.

Certain animals were subjected to trials directed at the determination of the affects of dry and humid heat; it was found that cold-blooded animals such as flies and frogs survived longer in a humid atmosphere, while the sparrow and rat succumbed more quickly under conditions of high humidity. Some histological findings are illustrated showing that the organs of rats killed by heat stroke were in a generally congested state, with oedema of the brain and neuronolysis in the spinal cord. These changes were greater in the case of exposure to moist than dry heat.

Protection from heat is given by the use of white clothing which reflects and refracts the sun's radiant energy. Continued movement of the air over the skin is protective from sun burning, but even in a still atmosphere some reduction of temperature can be attained by the use of sprinkled water, which need not be cool. It is pointed out that for protection against sun burning there should be proper fore and aft ventilation of the head gear, with cross-bands to prevent the direct contact of the top of the helmet with the scalp.

R. G. Bannerman.

SCOTT (H. Harold). **Tuberculosis in the Tropics.**—*Brit. Jl. Tuberculosis*. 1929. Oct. Vol. 23. No. 4. pp. 179-189. [21 refs.]
[Summary appears also in *Bulletin of Hygiene*.]

This brief summary of an important subject sets forth the main facts and places before the reader a clear conception of how tuberculosis starts and spreads in primitive communities.

"First of all comes the introduction of the bacillus into 'virgin soil,' a much abused and sometimes misunderstood term in regard to this disease . . . ; thereafter, the mode of life, habits or change of habits, industrialism, overcrowding, and general want of hygiene foster its spread."

"In large native communities near centres of industry carried on by Europeans tuberculosis becomes a very grave menace. The unceasing and increasing commerce and industry lead to greater and closer intermingling of the races. Those natives who acquire a massive infection die off rapidly, others return to their home villages carrying with them the virus which is destined to exercise its fatal effect in the family circle, which in turn becomes a fresh focus of dissemination."

The author discusses these questions from the point of one who has been in close touch with natives and whose knowledge of tuberculosis is based not only on clinical but on extensive post-mortem observations and his paper will repay close study.

"Part of our duty in bearing the white man's burden" he concludes, "is to relieve some of that which we have ourselves imposed, and to conserve the health of natives who are brought into association with us in the course of industrial, educational and other developments."

S. L. Cummins.

BEIHEFTE ZUM ARCHIV FÜR SCHIFFS- UND TROPEN-HYGIENE. 1929. Vol. 33. No. 2. pp. 5-40 [49-84]. With 6 graphs (1 map). Die Verbreitung und Behandlung der Tuberkulose in ueberseeischen Ländern. Die Verbreitung der Tuberkulose in Südamerika, Süd- und Ostasien. [**The Prevalence of Tuberculosis in South America, South and East Asia.**] [ROESLE (E.).] Die Behandlung der Tuberkulose in ueberseeischen Ländern. [**The Treatment of Tuberculosis in Foreign Countries.**] [WOLFF-EISNER (A.).]

This work is divided into two main parts. The first dealing with the prevalence of tuberculosis in countries abroad, excluding purposely Europe and the United States of America, occupies three-fourths of the whole and is largely statistical, the figures having been collected from sources as reliable as possible by Dr. Roesle of Berlin. The second, which is concerned with the treatment of the disease, is contributed by Professor Wolff-Eisner. The latter is brief and is merely a plea in general terms for the more extensive use of tuberculin.

Dr. Roesle considers in turn the prevalence of tuberculosis in South America, Chile, Uruguay and the Argentine, at first generally and then in more detail as regards the chief towns, Rio de Janeiro, São Paulo and Buenos Aires. It is only in the large towns that anything approximating reliable statistics is obtainable. He presents in tabular form the census figures and the numbers per annum dying from tuberculosis of all organs per 10,000 in 1910-12 and from 1925-28 in each of the Mid and South American States, including Cuba in the former, Dutch Guiana, Colombia, Ecuador and Peru in the latter, in addition to those already mentioned. In Buenos Aires, Rio de Janeiro and São Paulo, statistics show that the mortality from tuberculosis has declined fairly steadily during the last 40-50 years; it must not be forgotten, however, that the figures, in the earlier years at least, are far from reliable, but they do not on that account lose all value when compared *inter se*. Thus, on comparing 1900, 1910 and 1925, as is shown by a table, the decrease is steady in nearly all the 39 States named, notable exceptions being Manáós in the Amazonas where the deaths per 10,000 have increased from 14.0 in 1903 to 21.8 in 1910-11, and to 26.7 in 1926; San Salvador (Bahia) from 21.3 to 33.6 and 35.4 in the same years; and Montevideo from 18.4 in 1900 to 24.6 in 1910-11, and 25.1 in 1926.

India next comes under consideration. In the Annual Report of the Director of Public Health for the Bombay Presidency for 1923 the number is stated to be 8.4 per 10,000—15.9 for the towns, 6.6 for rural districts. Figures are given for several large towns for the years 1922 to 1927 inclusive; those for Calcutta are nearly double those for Bombay, and those for Madras nearly treble. In fact, Madras heads the list, the number having risen from 19.5 for pulmonary tuberculosis per 10,000 in 1922 to 30.5 in 1927.

The prevalence in China is difficult to determine since it is only in European towns such as Hongkong and Shanghai that statistics of any value are obtainable. In Hongkong from 1905-9 the average mortality from tuberculosis was 22 per 10,000. It rose in 1922 to 33, when this disease constituted 14 per cent. of all causes of death. In Japan, the figures given for the whole empire were 25.3 in 1918, 19.4 in 1925, per 10,000 population, whereas in the large towns of over 50,000 inhabitants the corresponding figures were 39.0 and 26.1. The average for the period 1921-25 was 20.5 for Japan, the returns for Germany during the same period being 13.1 and for England and Wales 10.8.

More accurate statistics are obtainable from the Army returns of Japan, Germany, European and Native troops of British India, and the Dutch Indies, but these are too specialized to convey much information regarding the actual prevalence of the disease in the countries concerned. From the British Army in India there were in 1925 nine admissions to hospital per

10,000 for pulmonary tuberculosis, 31 from the Native army, the corresponding figures for the Dutch Indies being 35 and 54. The general inference is drawn that the disease is rife among the native population whence the army is recruited. Some returns are given also for Persia and Turkey, but the figures are so low (3.4 per 10,000 in the latter) that they are almost without doubt incorrect. In Manila the tuberculosis death-rate is going up; in 1913-15 it was 44.4, ten to twelve years later 56.1.

Tables of figures, charts and maps are presented, setting forth graphically the statistics on which the above statements are based—a standing testimony to the zeal and patience of the author. [It seems a strange omission, nevertheless, when writing on tuberculosis in foreign countries, to give no reference to Australia, New Zealand, South Africa, or any of the British Colonies (except Hongkong) from which equally, if not more, accurate statistics would have been obtainable with less difficulty.]

H. H. S.

HEINEMANN (H.), KOUMANS (A. K. J.) & PIRNGADI (R.). Verslag der polikliniek voor behoeftige borstlijders te Medan over de jaren 1927-1928 en 1928-1929. [**Report on the Polyclinic for Lung Patients at Medan for the Years 1927-1928 and 1928-1929.**—*Geneesk. Tijdschr. v. Nederl.-Indie*. 1930. Mar. 1. Vol. 70. No. 3. pp. 241-250.]

These two years were the second and third during which the polyclinic was held. The number of patients (523 during the first year) was in these two years respectively 710 and 522 (together 1,232). One hundred and thirty-four patients suffered from affections not within the scope of the polyclinic, 691 suffered from various other diseases of the respiratory tract (bronchitis, pneumonia asthma, etc.) and 407 with certainty or probability from tuberculosis, either of the lungs or of other organs. Special classes of natives appear to be particularly exposed to the infection (employees of the Government Opium Monopoly, Chinese goldsmiths).

Roentgen examination was in some cases of paramount importance, especially in view of the early recognition of isolated exsudative foci.

The authors hold optimistic views as to the scope of treatment. Their methods are conservative; they reject artificial pneumothorax in this out-patient treatment, but recommend carefully conducted respiratory exercise in treatment as well as prophylaxis. Further, their unspecific treatment consists of lime (lime water, calcium lactate, kalzan), silicum (Silhstren), cod-liver oil, vitamin administration (lime juice, katjang idjoe), stimulation of the appetite (creosote, tinctura cinchonae), ultraviolet rays, salt restriction in the diet (GERSON, SAUERBRUCH). As a specific they employ SHIGA's tuberculosis vaccine, of the results of which some strikingly successful cases are briefly quoted. Of course, treatment of other complicating diseases is necessary.

The authors emphasize the necessity of hospital accommodation for the serious cases which are important sources of infection in their villages. This they consider to be more urgent than the sanatorium treatment of lighter cases.

W. J. Bais.

KLEINE (F. K.). Beobachtungen ueber Tuberkulose unter den Eingeborenen im Innern Ostafrikas. [**Tuberculosis among Natives in the Interior of East Africa.**—*Deut. Med. Woch* 1930. Jan. 24. Vol. 56. No. 4. pp. 130-131. [Robert Koch Inst., Berlin.] [Summary appears also in *Bulletin of Hygiene*.]

After summarizing the views of other observers as to the marked susceptibility of African natives to tuberculosis, an observation which is based on the rapid course of the disease in natives exposed to infection

in Europe or in the course of industrial developments in Africa, Kleine describes his own experiences in the villages of the interior.

In Karewa, a district to the south of Lake Tanganyika, with 1,400 inhabitants, he was shown by Dr. ATIMAN of the White Fathers Mission, an elderly married but childless woman with pulmonary tuberculosis and a positive sputum. It appeared that she had suffered from the disease for at least three years. Her husband appeared healthy.

Other cases of a similar type were seen elsewhere. The actual number of cases diagnosed is very small; only five out of 9,000 clinical examinations over a period of five years at Sikonge; only four cases in several years of observation at Karewa.

At Urwira, Kleine carried out von Pirquet tuberculin tests on 103 adults and 51 children. He found 10 positives in adults and only one positive amongst the children, the latter in the 4-year old child of a tuberculous mother. He concludes :—

1. That in East Africa, so far as concerns the interior, the infection of tuberculosis is spread not during childhood but rather in adult life, at an age when individuals quit their districts to seek work elsewhere.

2. The disease most commonly runs a relatively benign course and may be recovered from if the natives are well fed and kept quietly at home.

3. There is no reason to fear an epidemic outbreak of tuberculosis in Central Africa. The tuberculization of the population is likely to proceed gradually.

[The observations of Dr. Kleine are very much in line with the as yet unpublished findings of members of the South African Tuberculosis Research Committee.]

S. L. Cummins.

GIROLAMO (Lionti). Sulla diffusione della tubercolosi nei Libici e negli Eritrei. [**The Spread of Tuberculosis in Lybia and Eritrea.**]—*Arch. Ital. Sci. Med. Colon.* 1929. Sept. 1. Vol. 10. No. 9. pp. 451–458. English summary p. 459. [Colonial Hosp., Benghazi.]

Statistics show that prior to 1910, tuberculosis in Eritrea was a comparative rarity. In the period 1889–99 only 4·44 per cent. of deaths in the military hospital at Massawa were due to it; in 1916–28 in the Colonial Hospital, Asmara, 29 per cent. died from pulmonary tuberculosis. In the quinquennium 1924–28 tuberculosis cases constituted 9·26 per cent. of patients in the Benghazi Hospital; the townspeople contributed 1·47, Lybians 11·2, Eritreans 21·79 per cent. of the total. Of 1,071 total deaths, 625 (58·35 per cent.) were due to tuberculosis; the Lybians accounted for only a little over 7 per cent. of these, whereas Eritreans and Somalis formed 89·12 per cent. The spread is very great among coloured troops coming from Eritrea to serve in Cirenaica, and the need for a special institution for dealing with these cases is strongly urged, and clearly on good grounds.

H. H. S.

PROCEEDINGS OF THE ROYAL SOCIETY OF MEDICINE. 1930. Mar. Vol. 23. No. 5. pp. 733–745 (Sect. of Trop. Dis. & Sect. of Path. pp. 47–59). [11 refs.] **Discussion on Tropical Diseases arising from Dietetic Deficiency.** [MEGAW (J. W. B.), FINDLAY (G. M.), DAY (H. B.), BRAY (G. W.), CLARKE (Tertius), AYKROYD (W. R.), STANNUS (H. S.), BARTON (J. Kingston), CHRISTOPHERSON (J. B.), THEOBALD (G. W.).]

Major-General J. W. B. Megaw.—There are three types of food deficiency : (1) Shortage of food as a whole ; (2) Shortage of proteins ;

(3) Shortage of vitamins. The first is common to millions of people in the tropics who live always on the borderline of starvation. Medical workers must educate Governments and peoples to realize that the well being of a community rests upon production, controlled reproduction, disease prevention, and the maintenance of personal security. The second type is also extremely common, most people in the tropics suffering from shortage of protein supply. One might almost say—look after the proteins and the vitamins will look after themselves. Under the heading vitamin deficiency the speaker warns against the wide-spread assumption that avian polyneuritis and human beriberi are the same disease.

He is of the opinion that beriberi is not due to deficiency in vitamin B. Epidemic dropsy and beriberi cannot be dissociated, and the speaker has already given reasons why the former cannot be regarded as a pure deficiency disease. In short, beriberi must be regarded only as a term applied to a group of diseases.

Dr. G. M. Findlay.—Our knowledge of food deficiency has been gained by observations upon disease in human subjects and from feeding experiments on animals. Deficiency may be quantitative and qualitative. Various examples of qualitative deficiency mostly as regards vitamins are given. Vitamins B₁ and B₂ are considered, together with their roles in the causation of beriberi and pellagra. In yeast two other substances are present: (1) Bios, which is necessary for the growth of certain yeasts in inorganic media; and (2) a substance, the absence of which causes in rats a condition the pathology of which is indistinguishable from that of pink disease in children. Vitamin B₁ deficiency in man and animals differs in certain respects and true beriberi should be differentiated from nutritional oedema, probably due to protein lack, and epidemic dropsy. It is claimed that lack of vitamin B₂ produces a disease in rats not dissimilar to human pellagra.

Dr. H. B. Day.—Discussed pellagra in Egypt and the work of GOLDBERGER. He suggests that a larger protein consumption might need more vitamin B than when the protein was reduced to a minimum. Vitamin B seemed to act in the body like insulin.

Dr. G. W. Bray.—Referred to infantile beriberi in the Mandated Territory of Nauru, in the Polynesian group of islands, off New Guinea. Previously 50 per cent. of the infants died under the age of one year. The natives do not eat rice but coconut products, fish, and native fruits and the diet was deficient in respect of B factor. The clinical appearance of the children was that of infantile beriberi with a huge liver, distended stomach, enlarged right heart, leucopenia, etc. The yeast grown in the sap of the coconut palm, emulsified with cod-liver oil, caused remarkable improvement in the babies. Since this treatment was begun there has been only one death and the average weight is now 19 lbs. at six months instead of at one year, as previously.

Dr. Tertius Clarke.—True beriberi occurs in Malaya and not in India and unpolished rice will cure it. Kedah produces its own rice, which is neither polished nor parboiled, and there is no beriberi.

Dr. W. R. Aykroyd.—Gave his experiences with beriberi as it occurs in Newfoundland and Labrador. Here polyneuritis, myocarditis and occasional oedema were found among people suffering from malnutrition. The condition responded to dietetic treatment. For 3–4 months a year the diet was almost restricted to refined white flour bread, with a small addition of salt beef and pork, molasses, etc. The cases occurred during the worst dietetic season, i.e., April, May and June, and the

disease was definitely associated with poverty. It is interesting to note that the wrecking of a cargo of wholemeal flour lessened the number of cases in the district and that potato eaters rarely develop beriberi. In Labrador beriberi is, as a rule, rare because fresh meat is usually available. Most of the cases in these northern countries are of the "dry" type, and it is suggested that the "wet" form is beriberi plus hunger oedema.

Dr. G. W. Theobald.—Stated that the treatment of beriberi by varying the diet and prohibiting rice was not as simple as had been suggested. He had seen many cases of beriberi, associated with pregnancy, which showed no difference from the avian type experimentally produced. Siam, the third greatest rice exporting country in the world, has to polish its rice for the London market. The London market is thus the cause of beriberi in Siam. The speaker hoped that the League of Nations would tackle this and other similar urgent problems. "In modern Siam the Government would fain fill the bellies of their people with an expensive extract from the husks, which were indeed given to the swine to eat."

A. D. Bigland.

AYKROYD (W. R.) **Famine Oedema.**—*Brit. Med. J.* 1930. Aug. 16. pp. 247–248. [10 refs.] [Summary appears also in *Bulletin of Hygiene*]

Clinically oedema has been found at times associated with all the food deficiency diseases except rickets, and since these diseases usually occur in association with general mal- or under-nutrition it is possible that the oedema is due to a shortage in one of the dietary fundamentals other than vitamins. The evidence seems to point to shortage of protein as the most likely cause. Famine oedema appears to respond to a good all-round diet, probably containing all the dietary essentials: The poorest Newfoundland families in late spring and early autumn may be reduced to a diet made up almost entirely of white flour bread, with very scanty additions of molasses, salt meat and salt fish and little else. At times, the diet may be reduced to bread and molasses, a régime which usually produces beriberi, a common disease in Newfoundland. Both the wet and dry forms occur, the latter being by far the commoner. A case is described of a woman of 39 years, who had marked oedema of the legs with severe ascites. For six months previous to the onset of the disease she had lived on a diet of dry bread and molasses, and for years previously her diet had not been far above this level. She had been in hospital 15 years previously suffering from typical dry beriberi which improved on dietetic treatment. A diagnosis of hunger oedema was made as typical signs of beriberi were lacking. A high protein diet without much vitamin B was given, but she became rapidly worse, and paracentesis was performed, and she was given an anti-beriberi diet when her condition slowly improved, but paracentesis had to be repeatedly done. A laparotomy revealed nothing to account for the recurrent ascites. It seems impossible that this was a case of famine oedema in which the capillary walls were permanently damaged, though the patient's general condition improved under dietary treatment. It is peculiar that a patient, who had practically lived on dry bread for six months, should develop this condition rather than one of the commoner deficiency diseases.

H. N. H. Green.

OSMAN (A. Arnold). **Swelling of the Feet and Ankles not associated with Albuminuria or Gross Organic Disease. Pathogenesis and Treatment of a Common Symptom.**—*Brit. Med. Jl.*, 1930. Apr. 26. pp. 780-782. [4 refs.] [Queen Mary's Hosp., & Guy's Hosp., London.]

Oedema in the absence of albuminuria is a symptom of many conditions from beriberi to varicose veins in the legs. Here, however, is described a condition characterized by puffiness or swelling of the feet and ankles and not related to any of the usual causes. It occurs most commonly in debilitated females usually of the hospital class and should not be confused with excessive fatty deposit or with the erythrocytosis crurum puellarum of Parkes WEBER. The condition under description is limited to a pure excess of water in the tissues. The underlying cause appears to be an acidosis, i.e., a reduction of the concentration of bicarbonate in the plasma.

"The type of oedema described in this paper occurs mainly in the feet, ankles, and legs, is at its maximum in the evenings, is worse after exertion and in hot weather. It may be constantly present, waxing and waning with the factors just mentioned, or may only occur under some of these conditions, disappearing apparently spontaneously for weeks or months at a time, and then perhaps recurring. It should be noted that those conditions—menstruation, exercise, etc.—which are associated with an increase in the oedema are also those usually accompanied by a decrease in the plasma bicarbonate."

Treatment consists in giving alkalis according to the following method. Potass. citrate and sod. bicarb. gr. 30 of each with minims 30 of syr. aurantii in an ounce and a half of water are given in increasing doses till as much as 600 or 700 grains a day, or more if necessary, are taken. The fluid intake should be limited to about 3-4 pints per day. Of 16 cases thus treated the oedema cleared up completely in 13. Six subsequently relapsed, but of these, 4 were again cured by resuming their former dose.

The author is of the opinion that the good results obtained from alkali treatment confirm his contentions as to acidosis being the cause of the condition.

A. D. Bigland.

CLARKE (J. Tertius). **The Geographical Distribution of Rheumatic Fever.**—*Jl. Trop. Med. & Hyg.* 1930. Sept. 1. Vol. 33. No. 17. pp. 249-258. [36 refs.] [Summary appears also in *Bulletin of Hygiene.*]

Various authors, here quoted, have expressed the opinion that rheumatic fever is non-existent or, at least, very rare in the tropics. In Perak, F.M.S., out of 150,000 in-patients the author himself did not meet with a single case of rheumatic fever, mitral stenosis or chorea. In post-mortems he found no case of a valve suggestive of the scarred valve of a rheumatic heart. Similarly in a series of 600 autopsies in Singapore, Drs. FLETCHER and DUNCAN found no case of mitral stenosis. Evidence quoted from Canada and the United States shows that the amount of rheumatic fever diminishes as the tropics are approached. At New Orleans, which is in the latitude of 30° N., there is so little as to raise doubt whether there are any genuine cases at all. Some

workers believe that the disease exists at Panama, but there is such a mixed population there that there can be few persons of 20 years of age who were born there.

Medical returns are given for thirteen tropical Dependencies for 1925 and/or 1926 and for 1928. At first sight these suggest that the disease actually does occur though the incidence is very slight. For instance 914 cases out of 596,028 in-patients are diagnosed as cases of acute rheumatism or rheumatic fever; this is 0.15 per cent. of the total sick whereas in St. Bartholomew's and in St. Thomas's Hospitals the proportion is about 2.0 per cent. or 13 times as much. Even this low incidence the author believes, for various reasons advanced, is due largely to errors of diagnosis. But even if all the returns were correct the difference in the amount of the disease in the temperate climates and in the tropics should indicate that there is some factor, common in one part and rare in the other, which investigation should eventually discover.

A. B. Hill.

MACKINNON (M.). **Rheumatic Fever and Chorea in Kenya.**—*Kenya & East African Med. Jl.* 1930. Mar. Vol. 6. No. 12. pp. 358–367. [Summary appears also in *Bulletin of Hygiene.*]

Seven cases are described of rheumatic fever or chorea occurring in Kenya [? at Nairobi.] All but one were in children, and in that case there was a history of rheumatic fever at eight years. In 6 instances there was evidence of a cardiac lesion. The choreic symptoms were severe. The author concludes that rheumatic fever and chorea are rare in Kenya, but apparently very severe when they do occur. Two acute rheumatic cases in adults are also described, one regarded as toxic arthritis, the other as of endocrine origin. Reference is made to the rarity of rheumatic fever in the tropics and to the views on its etiology of Tertius CLARKE.

A. G. B.

ROBIC (J.). Sur la recrudescence de la diphtérie à Tananarive et sur l'utilité de la création d'un centre de prophylaxie antidiphtérique. [**Recrudescence of Diphtheria at Antananarivo and the Value of a Prophylactic Centre.**].—*Bull. Soc. Path. Exot.* 1929. Oct. 9. Vol. 22. No. 8. pp. 748–753. With 1 chart in text.

Since the beginning of the year diphtheria bacilli have been found in 10 natives and 18 Europeans; 16 of the 28 were children. The disease was first identified bacteriologically in Madagascar by THIROUX in 1901, in which year there was an epidemic of 83 cases at the capital. A few cases have been detected in each year since with a recrudescence in 1916, and an increase again in the year under notice, dating from the winter of 1926 and thus corresponding with an extension and increase of virulence in France. The author asks whether diphtheria is as frequent and as grave in the native as in the European. Little information is available. Throat smears are rarely made from native children. Anti-diphtheritic vaccine, apparently anatoxin, has been used in Madagascar since the end of 1927; 250 European children have now received it. It is suggested that its use should be extended to native children.

A. G. B.

KIRSCHNER (L.). The Bacteriology and Pathology of Diphtheria in the Dutch East Indies.—*Meded. Dienst d. Volksgesondheid in Nederl.-Indië*. 1929. Vol. 18. No. 1. pp. 164–183. [48 refs.] [Pasteur Inst., Bandoeng.] [Summary appears also in *Bulletin of Hygiene*.]

The author records an interesting series of observations on the incidence of diphtheria in the Preanger District of Java, during the period 1921–1927. He notes the considerable increase in the number of recorded cases, which followed the provision of facilities for bacteriological diagnosis in the Pasteur Institute at Bandoeng in 1923. It would appear that diphtheria is by no means an uncommon disease in the Island, since 116 cases were diagnosed at Bandoeng during 1926, 64 among Europeans, 40 among the native Javanese, and 12 among the Chinese population. It seems probable, indeed, that the infection is more widespread than these figures suggest; that it is an important cause of mortality in children; and that a mild form of the disease is relatively common. It may be noted that the strains of *C. diphtheriae* isolated at the Institute were submitted to a detailed bacteriological examination, including virulence tests in the guinea-pig. As the author points out, these results are strikingly dissimilar to those recorded by SMITS (see *Bull. of Hyg.*, Vol. 2, p. 285) for native coolies in the neighbouring island of Sumatra, among whom a high proportion of Schick-negative reactors was stated to be associated with an entire absence of diphtheritic infection. [It is clear that, in the light of this report, we cannot accept the Sumatra experience as providing an example of a population among whom the Schick-negative reactors must have developed their antitoxic immunity apart from naturally-occurring active immunization.]

W. W. C. Topley.

STIVEN (H. E. S.). Splenectomy for Egyptian Splenomegaly: an Account based on a Record of 390 Cases.—*Brit. Jl. Surgery*. 1929. Oct. Vol. 17. No. 66. pp. 230–235. With figs. 144–146 (1 map).

A paper read at the International Congress of Tropical Medicine and Hygiene at Cairo in 1928. The author is of opinion that splenomegaly, one of the most disabling diseases to which the Egyptian fellaheen are prone, is in their case due to heavy infections of bilharzia of the Manson type, and is confident that proof of this will ere long be forthcoming. After an experience of 390 splenectomies performed with his own hand he thinks it imperative to lay stress upon the difficulties and dangers of the operation and the necessity of careful preparation of the patient, with a view to sparing young surgeons the disappointment of high mortality in their early cases and consequent doubt as to the justifiability of the undertaking. The material to be worked upon being of the unhealthiest nature, a preliminary course of treatment lasting from five to six weeks is held to be necessary. Whether by examination of the stools and urine bilharzia ova or ankylostome eggs are found or not, it must be presumed that the patient is full of the common Egyptian parasites. This preliminary treatment includes as a matter of routine a dose of carbon tetrachloride of 2 to 4 gm., according to age and weight, twelve intravenous tartar emetic injections administered on alternate days, and an antisyphilitic course of 606 or corresponding drug. A rhubarb and soda mixture is given for the first week, subsequently an

iron and arsenic tonic and a full nourishing diet which includes "fool nabet," i.e., beans allowed to germinate in water for 48 hours. By these means health is greatly improved. On the evening before the operation an injection of pneumococcic vaccine must be given; otherwise the patient will almost certainly succumb to pneumonia.

Under spinal anaesthesia by stovaine the author makes an incision, varying in length with the size of the spleen, down the centre of the left rectus parallel with the middle line and starting at the costal margin. Skin and rectal sheath only are divided by the knife, the rectus itself being separated into two equal parts by a sweeping action of the finger. The peritoneum is opened, and in the absence of adhesions the spleen can be delivered through the wound. The pedicle is then suitably clamped, and the organ removed. The former is now transfixed with a long pedicle needle armed with black and white linen threads, linen being less apt to slip than the silk and the difference in colour insuring recognition of the necessary interlocking at a glance. Details of procedure are given, and the methods of dealing with adhesions, when present, described. These of necessity render the operation more complicated and difficult. The successive steps of wound closure and parietal restoration are noted. After operation patients are given nothing to drink for twelve hours, and then strict fever diet for five days; subsequently a purge, nourishing diet, and iron and arsenic. They usually leave hospital after fifteen days, and in two or three months are fit for work.

The immediate mortality is 13 per cent., and on following up the cases (always difficult in a country like Egypt) this figure is found to be increased to 19 per cent. by those who die after return to their villages. A dangerous operation is thus justified by results upon which the author deserves congratulation. Without operation expectation of life is extremely limited.

The paper includes a map showing the geographical distribution of the disease, but in this direction there is more work to be done. The villages at the end of canals would appear to be the most heavily infected.

J. J. Pratt.

TOULLEC (F.). Les splénomégaties chroniques. [**Chronic Splenomegalies.**].—*Rev. Prat. Malad. des Pays Chauds*. 1929. June. Year 8. Vol. 9. No. 6. pp. 283-286; 289.

The author classes splenomegalies as primary and secondary. In the first the spleen is the chief site affected and the characters of the enlarged organ are so fixed as to be distinctive. In the second the enlargement is a symptom super-added to other symptoms, it is variable in degree and has no distinctive characters. Of primary splenomegaly kala azar is an instance for the reasons named, and the fact that one can recover the causal parasites from the spleen; of secondary splenomegaly alcoholic cirrhosis is a type.

The secondary splenomegalies are divided again into the cirrhotic, the glandular and the blood forms. Among the cirrhotic splenomegalies are the parasitic—malarial, distomian and bilharzial. The malarial form must not be confused with the primary splenomegaly of malarial origin referred to below. The distomian form has often been seen in the Far East: it is due to *Clonorchis sinensis*, but the ova are not to be found in the spleen when they are present in large numbers in the liver. It must not be classed as primary. The same is the case with the chronic splenomegaly secondary to bilharzial cirrhosis, Egyptian splenomegaly described by DAY and FERGUSON. Examination during

life always demonstrates ova in the liver, but never, the author writes, in the spleen.* Among the glandular splenomegalies, in which enlarged glands and a changed leucocyte formula are always found, the author places that found in Chagas' disease.

Among the primary chronic splenomegalies are considered malaria and kala azar. The diagnosis of the malarial forms, says the author, will be established by the finding of an average degree of splenomegaly, a spleen with its long diameter transverse (couchée), smooth, regular and sensitive, and not giving the sensation of a notch. It must not be confused, as is so commonly done, with the splenomegaly secondary to malarial hepatic cirrhosis or malarial cachexia. The author notes that SADI DE BUEN has pointed out if in examining a large spleen one feels the notch one should think of kala azar.

A. G. B.

GRAHAM (J. W.). **A Note on Ganglion.**—*Kenya & East African Med. Jl.* 1930. June. Vol. 7. No. 3. pp. 78-79. [1 ref.]

Among 431 cases of tertiary yaws seen in 1926 in Kigoma, Tanganyika Territory, there were 14 patients with ganglion; of 18 ganglia 15 were on the wrist, 3 on the knee. The case here described was that of a native male of 20 with a ganglion on the back of each hand. There was a scar as of yaws. The W.R. was positive. The patient received in his muscles 18 grains of bismuth sodium tartrate in doses of 3 grains twice weekly and was discharged 3 weeks later with no sign of the swellings.

A. G. B.

MOORE (D. Fitzgerald). **Clinical Cure of Ganglia by N. A. B. and Bismuth.** [Correspondence.]—*West African Med. Jl.* 1929. Oct. Vol. 3. No. 2. p. 48.

The author refers to papers by FRANKLIN and by MACGREGOR (this *Bulletin*, Vol. 23, p. 931; Vol. 25, p. 11). He himself has treated 30 consecutive cases with success with a course of 7 injections of 0.3 gm. N.A.B. with 1 cc. of Bisoxyl or its equivalent. A striking feature of ganglia in Nigeria is their symmetry, suggesting a constitutional disease which "may well be yaws." Cases of acute teno-synovitis react to the same treatment.

A. G. B.

ROGERS (Leonard). **Forecast of the Probable Major Variations in Cholera, Smallpox and Plague in India during 1930, based on the Meteorology of 1929.**—*Indian Med. Gaz.* 1930. Apr. Vol. 65. No. 4. pp. 181-185. [Summary appears also in *Bulletin of Hygiene*.]

The author has shown (see this *Bulletin*, Vol. 26, pp. 83 & 633) that the major epidemics of smallpox, cholera and plague are dependent on antecedent meteorological variations. For example he considers that the factors influencing cholera are: (1) Low monsoon and winter rains of the previous year; (2) a high degree of susceptibility due to

* In a summary of "Egyptian Splenomegaly and its Relation to Schistosomiasis" by R. B. COLEMAN [this *Bulletin*, 1927, Vol. 24, p. 174] the statement is made: "Microscopical examination of spleens always shows the presence of the eggs of *S. mansoni*." For spleens LIVER should be read. However, Dr. Marrian PERRY writes that in Egypt ova are in fact found in the spleen (how commonly he does not say) [*Trans. Roy. Soc. Trop. Med. & Hyg.* 1929, Vol. 22, p. 543.]

absence of recent epidemic prevalence; and (3) a favourable absolute humidity of about 0.400 and over at the time of the usual seasonal increase of cholera in the particular area. A table is given forecasting the probable cholera incidence in separate provinces of India in 1930. In East and West Bengal the forecast is that incidence will be about average, in East and West United Provinces excess incidence is predicted caused by Allahabad Kumbh Fair, Punjab moderate increase over average, West Central Provinces average to low unless infected from Bombay Deccan where average to some excess is predicted.

With regard to smallpox it is stated that "the remarkably well distributed monsoon rains of 1929 naturally resulted in only slight variations in the monsoon absolute humidity in most of the provinces of India, consequently few material variations from the average smallpox prevalence in 1930 are to be expected." Only in the central Provinces, and N.W.F.P. is it predicted that the incidence will be above the average.

The forecast of plague is rather low incidence in Bihar and Orissa, and especially in the central Provinces and possibly slight excess in the Punjab.

It is concluded that no very great variations of cholera, smallpox and plague may be expected in 1930 except the regularly recurring twelve-yearly Allahabad Kumbh Fair cholera one in Bihar and the United Provinces.

H. M. Woods.

ROGERS (Leonard) **Further Experience in forecasting Epidemics of Smallpox, Plague, and Cholera in India, and its Bearing on the Reduction of Cholera.**—*Proc. Roy. Soc. Med.* 1930. Apr. Vol. 23. No. 6. pp. 793–801 (Sect. Epidemiol. & State Med. 27–35). [5 refs.] [Summary appears also in *Bulletin of Hygiene.*]

In former studies the author showed that certain meteorological variables were closely related to the incidence of smallpox, plague and cholera in India. The records are now analysed for the years subsequent to that report, and for all three diseases it is found that their prevalence in the different provinces conforms remarkably closely with the rules worked out in the earlier paper. In fact, these years, 1923–29, furnish striking examples of the feasibility of forecasting even localized epidemics by a study of the previous climatic records.

The Hardwar Kumbh Fair, which is held every twelve years, was responsible for an epidemic of cholera in 1927. Local sanitation at the fair sites fails to control its spread by the pilgrims, and protective inoculation appears to be the only feasible method of combating the disease. The people must be educated up to the point when they will be ready to submit to inoculation before, instead of only after, exposure to infection.

A. B. Hill.

GAMBIER (A.). Un cas de mélioiïdose observé à Phnôm-Penh. [**A Case of Melioidosis at Phnôm-Penh.**].—*Bull. Soc. Path. Exot.* 1930. May 14. Vol. 23. No. 5. pp. 436–441. [3 refs.]

The case occurred in a Russian who resided ordinarily in Siam. At first the symptoms pointed to insanity and a confusional state. In answer to a question he began his reply in French, continued in Russian and finished with German. A coccobacillus was isolated by haemoculture, which from its appearance was at first taken to be the plague bacillus. It was found,

however, to be motile and this led to further investigation. The tests applied and direct comparison with strains of *Pf. whitmori* showed it to be identical with this organism.

W. F. Harvey.

LETONTURIER, MARTIN & SOUCHARD. Un nouveau cas de mélioiïdose observé en Cochinchine. [**A New Case of Melioidosis in Cochin China.**] —*Bull. Soc. Path. Exot.* 1930. Mar. 12. Vol. 23. No. 3. pp. 273-279. With 1 text fig.

The cases of melioidosis now being reported are increasing in number. About fifteen altogether have so far been published. The present case was that of a young officer resident only four months in the colony. Some 12 days before admission to hospital he felt slight chilliness, was tired and had a slight rise of temperature. He continued at his work. On admission to hospital his condition was serious and resembled the torpid condition of a patient with typhoid fever. This diagnosis was the first one adopted. Blood culture gave what was thought to be *Bact. faecalis alkaligenes*. The appearance of orchitis and epididymitis, with what was assumed to be a collection of pus in the tunica vaginalis, presented a perplexing symptom. A polynuclear leucocytosis pointed to an affection other than typhoid fever in which there is usually pronounced monoleucocytosis. A second blood culture gave the necessary evidence to incriminate the bacillus of melioidosis. This was confirmed at autopsy where about 100 cc. of thick pus were found in the tunica vaginalis, the spleen was diffuent and there were no signs of ulceration in small or large intestine. The pus gave on culture the same bacillus as had been obtained by blood culture.

W. F. Harvey.

WOLLSTEIN (Martha) & KREIDEL (Katherine V.). **Sickle Cell Anemia.** —*Amer. Jl. Dis. Children.* 1928. Nov. Vol. 36. No. 5. pp. 998-1011. With 4 text figs. [22 refs.] [College of Physicians & Surgeons, Columbia Univ., New York.]

Summaries of previous papers on this subject are to be found in this *Bulletin* [Vol. 20, p. 670; Vol. 21, pp. 670, 671, 926; Vol. 22, pp. 669, 670; Vol. 24, pp. 66, 670; Vol. 25, pp. 387, 388, 1001]. The present paper reviews the records of 15 cases in New York negro children. Details are given of four "active" cases (ages between 3 and 4 years), three of which were fatal and were carefully investigated post-mortem, with the result that except for the anaemia no other cause of death was demonstrable anatomically or by histological methods; "all showed fatty degeneration of myocardium and liver, distension of the sinuses of the spleen with sickle cells, phagocytosis of the sickle cells by Kupffer cells in the liver, and iron pigment in the spleen, liver, and kidneys." Four other "active" cases are mentioned in which the causes of death are recorded as bronchopneumonia (2), pneumococcus meningitis and tetany, and three latent cases, where the causes of death are recorded as miliary tuberculosis (2), and pneumococcus meningitis. The clinical symptoms common to all the active cases of sickle-cell anaemia are reviewed, and the pathogenesis is discussed, as usual, and the hereditary predisposition is confirmed as a negro character.

A. Alcock.

COOLEY (Thomas B.) & LEE (Pearl). **Sickle Cell Anemia in a Greek Family.** —*Amer. Jl. Dis. Children.* 1929. July. Vol. 38. No. 1. pp. 103-106. With 2 text figs. [6 refs.] [Children's Hosp., Michigan.]

The authors regard this as the first observed instance of sickle-cell anaemia in an individual free from any reasonable suspicion of an admixture of negro blood.

The individual in this case is a four-year-old (American-born) Greek boy whose parents were natives of a small village in the Peloponnese. He was brought to hospital for anaemia, enlarged spleen, and jaundice, and on examination, along with confirmation of these points the superficial lymphatic glands were found to be enlarged, and moist preparations of blood showed a rapid and extreme development of sickle-cells. The blood of the parents and the other members of the family was also examined; that of the mother showed slow and incomplete development of sickle-cells, and in that of a fourteen-year-old brother elongate forms were seen which although not typical sickles, were so much like some observed in sickle-cell anaemia as to arouse suspicion.

The authors conclude that "the general acceptance of the dictum that sickle-cell is peculiar to the negro race has been too precipitate."

A. Alcock.

FRADKIN (William Z.) & SCHWARTZ (Leo S.). **Sickle Cell Anemia.**—*Jl. Lab. & Clin. Med.* 1930. Mar. Vol. 15. No. 6. pp. 519–529. With 3 text figs. [39 refs.] [*Jewish Hosp., Brooklyn.*]

A large part of this paper consists of a good and concise, but lengthy, review of the literature of sickle-cell anaemia; the laboratory findings of the case reported are given in remarkably full and precise detail and also occupy much space.

The case relates to a negress of 26 years, born and bred in S. Carolina. Her symptoms on admission (pain in the lower abdomen, fever, and vaginal discharge) were such as to consign her to the gynaecological department. There a tentative diagnosis of adnexitis with subacute pelvic peritonitis was made, for although sickle-cells were observed their significance was weakened by the urgency of the localized abdominal symptoms and also by the absence of any confirmatory sign in the relatives of the family. Sudden onset of pain and other symptoms in the upper abdomen, particularly on the right side, suggested acute cholecystitis and transfer to the surgical department. Here the condition on opening the abdomen was disclosed as a case of sickle-cell anaemia complicated by mesenteric tuberculosis. After the operation, which was followed by transfusion of 500 cc. of blood, the patient improved rapidly.

"Emphasis is directed to the fact that most patients with sickle-cell anaemia are susceptible to tuberculosis probably because of their lowered resistance to infection." The authors also conclude that a diagnosis of an "acute surgical abdomen" in a negro patient is hazardous without a previous search for sickle-cells.

A. Alcock.

STEINBERG (Bernhard). **Sickle Cell Anemia.**—*Arch. Pathology.* 1930. Apr. Vol. 9. No. 4. pp. 876–897. With 1 fig. [54 refs.] [*Toledo Hosp., Toledo, Ohio.*]

This is a comprehensive review of sickle-cell anaemia—its chronicle (with 54 documentary references), its incidence, its characteristic erythrocytes, its phases (latent and active) and its pathology, treatment, and prognosis. Itself a recension, it cannot be summarized further. It is a good piece of work; but, all be it that Thomas Hobbes wrote "words are but wise men's counters," it is to be regretted that the author has restored the base counter "sicklemia"—half good English, and a moiety bad Greek—to his sterling currency.

A. Alcock.

LEVY (Joseph). **The Origin and Fate of Sickie-Shaped Red Blood Cells.**—*Arch. Pathology*. 1929. May. Vol. 7. No. 5. pp. 820–826. With 2 text figs [30 refs.] [New Rochelle Hosp., New Rochelle, N.Y.]

“The change to the sickle shape observed in red cells is a phase in a profound disturbance of the formation of red blood cells. Embryonic red blood cells and normoblasts enter the systemic circulation. These cells proceed to divide or extrude their nuclei. The resultant cells project pseudopodia and assume bizarre shapes. Heat (body temperature) hastens the change; cold (0° C.) inhibits and may actually prevent it. After varying periods, some of the abnormally shaped red cells retract their pseudopodia and return to the parent form; others retain their bizarre shapes permanently. Refrigeration (0° C.) prevents the return of the cell from sickle shape to the form of the biconcave disk. Sickie cells kept at body temperature eventually disintegrate by fragmentation.”

A. Alcock.

LEWILLON (R.). Une épidémie de paratyphoïde C. [**An Epidemic of Paratyphoid C.**—*Bruxelles-Méd.* 1930. June 1. Vol. 10. No. 31. pp. 841–851. With 4 charts in text.]

This article treats of the occurrence, in the Katanga district of the Congo, of an epidemic in an imported labour force recruited from a tribe not possessed of great stamina and to a large extent suffering from chronic malaria. Recruits are isolated in an acclimatization camp under medical supervision and gradually introduced to work. All the recruits had originally been given T.A.B. vaccine. The disease was contracted before arrival in camp and proved to be an epidemic of paratyphoid C. Altogether, 41 cases occurred and 25 patients died. Numerous illustrative cases and temperature charts are given. Septicæmic conditions were a marked feature of the epidemic and at the post-mortem examinations the pathological lesions of the intestine were for the most part insignificant. Splenomegaly, however, was very constantly present. The diagnosis was made by means of blood culture and by serum agglutination test. The agglutination titres with patients' sera frequently exceeded 1 in 1,000 for paratyphoid C and were usually well below 1 in 400 for the typhoid bacillus. Prophylactic treatment of recruits is now by T.A.B.C. vaccine instead of by T.A.B.

W. F. Harvey.

GIGLIOLI (George). **Paratyphoid C, an Endemic Disease in British Guiana.**—*Jl. Hygiene*. 1929. Dec. Vol. 29. No. 3. pp. 273–281. [11 refs.]

Already noticed in regard to the essentially important point—the endemicity of paratyphoid C [see this *Bulletin*, Vol. 27, p. 564].

W. F. Harvey.

KOUWENAAR (W.). Bcteeckenis van het voorkomen van maagzweren in de tropen voor de studie der aetiologie. [**The Significance of the Occurrence of Gastric Ulcer in the Tropics for the Study of its Etiology.**—*Nederl. Tijdschr. v. Geneesk.* 1930. May 3. 74th Year. 1st Half. No. 18. pp. 2321–2341.]

It is often stated in the literature that gastric ulcer seldom occurs in the tropics. In Java, however, it has long been known, both clinically and by post mortem examination, that this is not the case. What has been found is that while gastric ulcer is frequent among Chinese,

Klings and Europeans, it is very rare among Javanese. An analysis of 2,173 post mortem examinations showed an incidence of 10.1, 5.6 and 0.95 per cent. among Chinese, Klings and Javanese (men) respectively. These percentages, with due regard to their probable errors, are significantly different for Chinese and Javanese. It is especially so for the earlier ages. After establishing the statistical fact of such a racial difference the author endeavours to use it for the elucidation of the causation of gastric ulcer. For the production of ulcer there are always necessary in the first place a primary lesion, such as an anaemic necrosis or an infarct, and secondly factors which combine to prevent healing. The various factors which may be concerned in the production of gastric ulcer are dealt with in very great detail. Among the most important may be reckoned the influence of food, vascular disease and constitutional susceptibility. As regards food there is but little difference in this respect between Chinese and Javanese. Nor is there much evidence for the incrimination of vascular affection as the cause of the condition. There remains the factor of constitutional liability and a great part of this article is taken up with a discussion from this point of view of the neurogenic causation of the disease. Two opposite views are held by those who subscribe to this theory, one which would explain the production of ulcer as a vagotonic effect, the other as a sympathicotonic effect. These different views may be labelled respectively the enterospastic and the angiospastic. If we investigate what is known regarding the action of the vegetative nervous system in the various races to be found in Deli, then we may lay down that climate acts as stimulant or irritant on that system among Europeans who suffer considerably from gastric ulcer, as little or no stimulant among Javanese who rarely suffer from gastric ulcer and as little or no stimulant among Chinese who suffer considerably from gastric ulcer. Climatic action, therefore, would not seem to be the reason for the difference in incidence between Chinese and Javanese. Then what is it that stimulates the neurogenic disposition? Various possibilities are considered, that of congenital predisposition, alteration of hydrogen ion concentration of the blood in the tissues (acidosis), endocrine gland influence, psychical disposition, organic nervous disease and asthenic habit of body.

It would seem necessary to investigate still more closely the various causes suggested with a view to explaining more satisfactorily the difference in incidence of gastric ulcer among the different races dwelling in the tropics.

W. F. Harvey.

YAO (H. Y.), YUAN (I. C.) & HUIE (Dorothy). **The Relation of Flies, Beverages and Well Water to Gastro-Intestinal Diseases in Peking.**—*Nat. Med. J. China*. 1929. Aug. Vol. 15. No. 4. pp. 410–418. With 1 chart in text. [6 refs.] [Peking Union Med. College, & Public Health Dept., Greater Peking,* China.]

The authors sought to discover which of three well-established agents in the spread of intestinal disease—house flies, contaminated beverages and well-water—was of relatively greater importance in Peking. They studied the problem in the summer of 1928, and give a detailed account of their methods.

Flies. Most of the households are provided with open or poorly covered latrines from which the excrement is removed daily with a scoop

* The variants Peking, Peiping, Peiping, which the careful reader will note, are not errors: all these forms are now used.

and conveyed to the country in open wicker baskets, so that flies have free access to it. Of over 384,000 flies trapped, the common house fly was present in 98.4 per cent. ; the relative distribution of other species was similar to that found elsewhere. By far the greatest number were taken in July and August, and a graph shows that August is the month in which the mortality from gastro-intestinal diseases rises to its maximum. It is computed that the number of bacteria on the surface of individual flies varied between 90 and two millions, and internally between 66,000 and 15 millions. The authors examined 50 batches of 100 flies each for the presence of faecal coli, and for dysentery, typhoid and cholera bacilli. Only one batch was free from coli. *Bact. dysenteriae* was isolated from the external washings of 6 batches and the internal contents of 12 batches, i.e., 30 per cent. of the batches examined. In 12 of 70 batches of flies examined either internally or externally in September human intestinal parasites were found—flagellates, ciliates, *E. coli* cysts, *E. nana* cysts and *E. histolytica* cysts (in 2 batches).

Beverages. A beverage composed of water, sugar and dried fruits, with floating ice, commonly hawked about the streets, was chosen ; the sources of contamination were many. Of 50 specimens obtained from 6 localities 27 contained *Bact. coli* of faecal origin and 10 samples contained *Bact. dysenteriae*.

Well-water. Three shallow wells in congested streets were examined in 54 specimens. The average of bacterial counts was 1,000–2,000 bacteria per cc. ; 34 samples contained *Bact. coli*, that is more than half.

The authors believe that flies are of greater importance in the transmission of disease than the fluids examined. Though the incidence and mortality from enteric fevers is very high in Peking typhoid and paratyphoid bacilli were not isolated.

A. G. B.

SILVAN (P.). Les diarrhées chroniques tropicales. [**Chronic Diarrhoea in the Tropics.**]—*Marseille-Méd.* 1930. Jan. 25. Vol. 67. No. 3. pp. 109–117.

As the result of alcohol, malaria, and insufficiency of hepatic function, the antiseptic properties of the bile are much diminished in the tropics. On the other hand a meat dietary predisposes towards enteritis and enterocolitis, which is aggravated by the presence of numerous parasitic worms or micro-organisms.

After giving a general description of sprue and amoebic dysentery the intestinal manifestations due to *Strongyloides stercoralis* are described. Dr. Silvan believes that this parasite produces cutaneous symptoms, digestive symptoms and diarrhoea. The diarrhoea appears to have no distinctive characters. Three or four liquid stools are produced during the day. Treatment should be partly dietetic, and when the infection is primarily responsible for the illness, thymol and santonin should be exhibited.

P. H. Manson-Bahr.

HARIDAS (G.). **Cases of Secondary Anaemia among Northern and Southern Indians in Singapore.**—*Malayan Med. Jl.* 1929. Dec. Vol. 4. No. 4. pp. 133–136. [1 ref.]

The author says that the primary type of anaemia is practically unknown in Singapore. The secondary anaemias sometimes resemble

pernicious anaemia with absence of HCl from stomach. A high colour-index is common and conditions such as sprue, ankylostomiasis, malaria or lead poisoning are present. Of the 25 cases collected, 12 were North Indian Hindoos; these people are "strict vegetarians," and in their own country get fresh wheat and barley, abundant cow's milk, fresh vegetables and fruits. In Malaya they live chiefly on rice and develop a poor state of nutrition. He finds that diet is more important than drugs and meat a necessity to rapid recovery. Many patients show marked improvement after administration of liver extract. Details are given of a few cases. The underlying conditions must be thoroughly treated.

A. G. B.

MACKIE (F. P.). **Malignant Anaemia of the Tropics.**—*Indian Med. Gaz.* 1929. June. Vol. 64. No. 6. pp. 305-307. [1 ref.]

Lately a good deal has been heard of a severe anaemia of pregnancy in India and of the anaemia of sprue. Mackie has resurrected some interesting notes made in Bombay more than 20 years ago which show that there was prevalent then, as now, a severe anaemia of aplastic type, not limited to pregnant females or to the female sex and quite distinct from the anaemia of sprue cases. The condition exhibits very low red counts, absolute leucopenia, relative small mononuclear increase, very low haemoglobin, colour index variable, normoblasts and megaloblasts scarce, microcytes frequent and much poikilocytosis and fragmentation of red blood corpuscles.

J. F. C. Haslam.

PHIPSON (E. S.). Sur une maladie nouvelle observée à Bombay. [**A New Disease seen at Bombay.**]—*Bull. Office Internat. d' Hyg. Publique.* 1930. May. Vol. 22. No. 5. pp. 927-928. [Summary appears also in *Bulletin of Hygiene.*]

The author reports from Bombay 15 cases of an affection of undetermined nature, which in 7 instances resulted in death. All were Europeans admitted to hospital for different reasons. After 3 to 31 days with no particular symptoms they presented an eruption and fever. The eruption had the appearance of a papulo-macular shining erythema, beginning at the trunk and then invading the rest of the body, limbs and face. The eyes are bloodshot with muco-purulent exudate; in severe cases the sclerotics rapidly ulcerate. Temperature varies between 102° and 104° F. The mouth and lips are dusky and sordes cover the tongue. The patients are apathetic and on the 3rd or 4th day pass into a typhoid state. In slight cases the eruption and fever may disappear and reappear once or more; recovery is accompanied by complete desquamation. Laboratory examinations have hitherto been unhelpful. Cultures of blood, urine, faeces, pharyngeal exudates, C.S.F. and contents of macules negative. Widal and Weil-Felix negative. Liver puncture, no leptospira. The disease is possibly an abnormal form of scarlatina [but no mention is made of the Dick or allied reactions].

A. G. B.

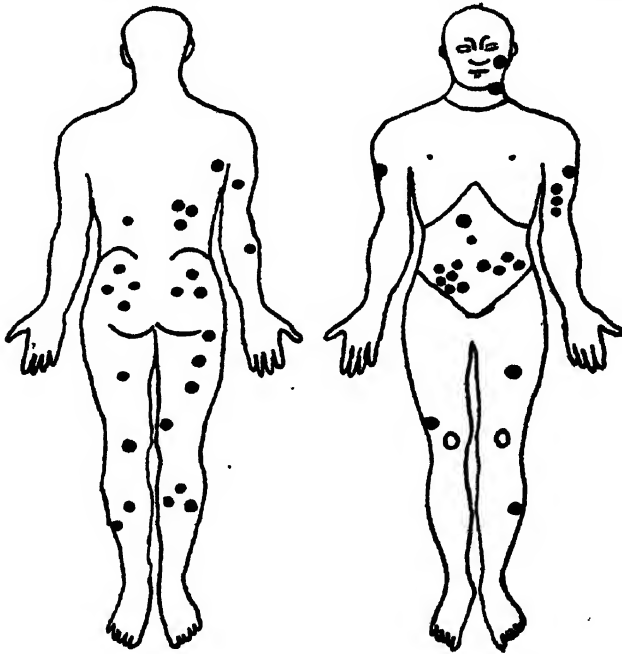
CARPENTIER (G.). Note au sujet d'une affection humaine signalée à Firouzkouh (Perse). [**Note on a Human Affection reported from Firuzkuh, Persia.**—*Bull. Soc. Path. Exot.* 1929. Oct. 9. Vol. 22. No. 8. pp. 677-679.]

The affection described is met with frequently on the great road which leads from Teheran east to the province of Khorassan. It is a fever following on the bite of a "large parasite" living in poor and ill-kept houses. Itching accompanies the bite, and a warm painful swelling with black central point, which is slow to disappear. The symptoms, which follow in 3-5 days, are fever, vomiting and jaundice. It is sometimes mortal. Twenty specimens were obtained of an Argasine tick, perhaps *Ornithodoros*, and were forwarded to the Pasteur Institute. The natives appear to be immune. The author suggests that the disease is a spirochaetosis. [Relapsing fever has long been known to occur in Persia, see this *Bulletin*, Vol. 25, p. 585. The tick incriminated is *Ornithodoros tholozani*.]

A. G. B.

SAYERS (Edward G.). **Tropical Myositis and Muscle Abscess.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1930. Jan. 30. Vol. 23. No. 4. pp. 385-400. With 14 text figs. & 1 map. [3 refs.]

Dr. Sayers was compiling this paper on myositis in the Western Solomon Islands when Dr. BUXTON's account of the disease in Samoa



Sites of lesions in Dr. Sayers' 26 cases of tropical myositis and muscle abscess.

Each dot represents roughly the centre of a lesion.

[Reproduced from the *Transactions of the Royal Society of Tropical Medicine and Hygiene*.]

came to hand (briefly noticed in this *Bulletin*, Vol. 26, p. 436], and reference to this is frequently made. The climatic conditions are

described with the conclusion that the area in question belongs to the hot moist tropics. The population is classed in two divisions—local natives, just over 6,000; and indentured labourers from Malaita in the Eastern Solomons, about 1,000. The number of cases seen was 26—local natives 19, indentured labourers 7. The incidence in each group was similar, an observation which is of importance when the origin of myositis is under discussion. Of the 26, 22 were males and 4 females, a similar incidence to BUXTON's; 19 were between the ages of 16 and 45; five were under 14 years, the youngest being 9 months. The lesions numbered 46, i.e., 1·8 to each case. Nine had non-suppurating lesions only, 11 had suppurating only and 6 had both kinds. The chances of any lesion resolving or suppurating are regarded as even. The author gives a table of the site of lesions similar to that of BUXTON. The distribution is shown graphically in the figure, on which the comment is made, that half the lesions are on the trunk and buttocks, and that there is a marked tendency for implication of the muscles of the iliac fossae. The parts of the body covered by the loin cloth are by no means less liable than the more exposed parts, an observation which is against insect bite causation.

He goes on to give the history of cases of non-suppurative, suppurative, and mixed cases. Severity varies much. Some run a high temperature with signs of acute infection; others are chronic and toxæmic symptoms almost absent. Several temperature charts are given. A note on pulmonary complications draws attention to BUXTON's suggestion that lung condition and myositis might be connected. Here six of the 26 had such complications, either frank pneumonia or consolidation at the lung base. As to temperature there is noted the occurrence of crisis or rapid lysis in non-suppurative cases. For pathology the author has little to tell us. He thinks that BUXTON's staphylococcus origin will not explain the non-suppurative cases.

The relationship to filariasis is then discussed, and here the author agrees with BUXTON who declares against a filarial origin. Filarial disease is comparatively common on Malaita; of 50 night bloods from Malaita labourers 8 contained microfilariae and he has seen several early cases of elephantiasis amongst them. In his own district of New Georgia he has seen only two cases of elephantiasis, one of which was probably leprotic, and in the night-blood of 150 no embryos were seen except in one case where Malaitan residence was proved. He believes then that filariasis is either very rare or absent in the Western Solomons, but it was noted above that the incidence of myositis differs little in the two groups. Microfilariae were sought in 12 cases of myositis; they were found only once—in a Malaita man. "It is very hard to reconcile the theory of filarial origin with the five cases occurring in children under 14." The author suggests that though the disease is not due to *F. bancrofti*, it may be of other filarial origin; microfilariae should be looked for in the skin; and he draws attention to the similarity of symptoms of trichinosis.

A. G. B.

Low (G. Carmichael); MANSON-BAHR (Philip); BUXTON (P. A.).
Tropical Myositis. [Correspondence.]—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1930. Mar. 17. Vol. 23. No. 5. pp. 547-551.

Dr. SAYERS' paper gave rise to this correspondence. Dr. Low argues that if muscle abscesses have a cause other than filaria, they should

occur in countries free from *F. bancrofti* infection, but in his experience they are not seen in Uganda (non-filarial) but are frequent in West Indies (filarial). Dr. Manson-Bahr "remains unconvinced that *F. bancrofti* is not the *fons et origo* of the whole trouble." and gives several references. Dr. Buxton's argument may be summarized thus:—

(1) The great majority of filarial abscesses occur in lymphatic glands, not in muscle.

(2) Forty-one Samoans with myositis had no more frequent infection with microfilaria and no higher incidence of hydrocele and enlarged epitrochlear gland than a large group of normal Samoans; (these physical signs are correlated with filarial infection).

(3) The disease attacks males much more frequently than females, and young adults rather than older persons, neither of which is easily explained by the filarial theory.

(4) It attacks large muscles, not usually the site of filarial infection.

(5) Myositis does not occur in the Tokelau and Ellice islands where filarial infection is frequent.

While he does not dispute that *F. bancrofti* occasionally occurs in an abscess in muscle, he suggests that the connexion between myositis and filarial infection lies in the realm of faith rather than of fact.

A. G. B.

ROBERTSON (Russell L.). **Tropical Myositis in Adamawa Province, Nigeria.**

—*West African Med. Jl.* Lagos. 1930. Apr. Vol. 3. No. 4. pp. 80–82. [3 refs.]

PATTON (C. R.). "**Bungpagga.**"—*Ibid.* pp. 82–83.

MOORE (J. Jackson). **A Case of Multiple Muscular Abscesses.**—*Ibid.* pp. 83–84.

ROSS (F.). **Case of Multiple Abscesses.**—*Ibid.* p. 84.

THOMSON (J. W.). **Notes on Cases of Deep Abscesses.**—*Ibid.* p. 84.

A.C. **Myositis.**—*Ibid.* pp. 85–87.

GRAY (G. M.). **Tropical Myositis.**—*Ibid.* p. 87.

JOHNSON (W. B.). **A Note upon Tropical Myositis.**—*Ibid.* p. 87.

SMITH (E. C.). **Laboratory Note on Four Cases of Muscle Abscess.**—*Ibid.* p. 88.

This formidable list of titles covers an original paper by Russell Robertson, 4 reprints of West African papers on this subject, an historical account by A.C., notes by Gray and Johnson, to whom the dossier was submitted, and a laboratory note by E. C. Smith.

Robertson, who writes from the Garkida Hospital, reports 20 cases. The disease was most prevalent in the rainy season, 17 of the 20 were males, the majority in the 3rd and 4th decades; a recurrence was not noted. The author would incriminate a staphylococcus; the infecting organism must be blood-borne owing to the wide distribution of infection. The disease is characterized by multiple necrotic abscesses in the deep muscles of body and limbs. Hard swellings appear about the fifth day of fever and proceed or not to suppuration. A table gives the location of the swellings and other data. Pus forms slowly and the temptation is to incise too soon; the author believes that many of the smaller abscesses would be absorbed if left alone. The loci forming pus averaged three in this series. Debility is great, but a fatal issue is rare.

This disease was described from Accra (1915) under the name *Bungpagga* and was attributed by Patton to a fungus.

A.C[onnal] after consideration of these papers and others, including those of BUXTON and SAYERS, thinks that myositis and filarial abscess are separate entities.

Gray notes that the disease has been attributed to a fungus (PATTON), a *pasteurella* (BOUFFARD) and an *entamoeba* (SHARP and MORRISON). He regards it as a low grade pyaemia.

Johnson regards it as "pyaemia occurring in a race which has a high resistance to pyogenic organisms, in which local abscesses tend to occur instead of spreading cellulitis and lymphangitis, and pyaemia instead of septicaemia."

In 4 cases examined bacteriologically by E. C. Smith *staphylococcus* was obtained in each instance.

A. G. B.

HANZAWA (Shogoro). Zur Statistik der Myositis purulenta acuta mit besonderer Berücksichtigung ihres Erregers. [**Statistics of Myositis purulenta acuta with Special Reference to its Causative Agent.**]—*Mitt. u. Allgemeine Path. u. Pathologische Anat.* 1930. Vol. 6. No. 2. pp. 333-346. [34 refs.] [Surg. Clinic & Bact. Inst., Univ., Sendai.]

After stating that this disease is far more frequent in Japan than in Europe or North America and giving a short account of previous publications (of which 34 are noted, mostly from Japanese sources), the author discusses his 114 cases (127 muscles) and gives 9 statistical tables. All were operated on at the Sendai Clinic and bacteriologically examined at the Institute. The disease occurred in the 1st, 2nd and 3rd decades, and was commonest between the 10th and 19th years. It was twice as frequent in males as in females. The lesion was localized in the ilio-psoas (22 per cent.), shoulder muscles (18 per cent.), back muscles (12.5 per cent.), seat muscles (11.8 per cent.). Frequently-used bellied muscles seemed most affected. There was no preference between the body sides. In the case of 20 muscles a predisposing cause, such as contusion or tonsillitis, could be demonstrated; in the other 107 none. In 123 instances there was infection by one bacillus, in 4 a mixed infection. In 109 cases the organism was *Staphylococcus pyogenes aureus*, in 10 *Streptococcus haemolyticus*. In the mixed infections the colon bacillus was associated with one of the others. In only seven per cent. of the cases was more than one muscle affected. [In the last respect at least this series differs from the tropical series.]

A. G. B.

BERGSMAN (S.). Elephantiasis of the Male External Genitalia—a Modification of the Usual Incision in the Operation for Elephantiasis of Scrotum and Penis.—*Amer. Jl. Trop. Med.* 1930. May. Vol. 10. No. 3. pp. 199-206. With 3 text figs. [3 refs.] [American Mission Hosp., Addis Ababa, Abyssinia.]

The author advances yet another modification of the incisions usually employed in the operation for elephantiasis of the scrotum and penis. His paper deals only with cases of tumour which had attained to a very large size. In two of these, admirably depicted in photographs, the weight of the removed specimens was 72 and 45 lbs.

respectively. As the author states, and as all surgeons with practical experience of the subject are aware, in such cases the tumour by its weight drags down a sufficiency of skin (often normal and healthy, as in the author's cases) to provide material for covering the essential structures denuded in the course of operation.

An incision is first made from the opening of the urinary tract on the surface of the tumour to the glans penis. A transverse cut across the upper end of this extending laterally on each side to a distance of one-and-a-half to two inches follows. Then from the extremities of the latter two further vertical incisions, four inches in length, extend upwards towards the pubes. A flap is thus marked out for subsequent use in covering the penis when denuded.

The cords, testes, and penis are freed in the usual way from the mass of elephantoid tissue in which they are imbedded. Normal preputial lining, when present, is of course preserved. From the upper ends of the two vertical cuts the neck of the tumour is encircled by an incision which should keep about three inches in front of the anal opening, and the operation proceeds to completion much on ordinary lines which need not be detailed.

J. J. Pratt.

Low (G. Carmichael) & DIXON (D. Strangways). **Elephantiasis treated by Protein Shock.**—*Lancet*. 1930. Jan. 11. pp. 72-73. [Hosp. for Trop. Diseases, London.]

In 1928 W. E. COOKE published a note on an early case of elephantiasis treated with benefit by protein shock (see this *Bulletin*, Vol. 25, p. 997). The authors here publish five cases in some detail. In each a course of T.A.B. intravenous inoculations was given, up to 200 million organisms. In two cases of well-developed elephantiasis no improvement followed. In one in which the diagnosis was recurrent lymphangitis the result is unknown; in another there has been no recurrence of lymphangitis. The authors think it doubtful whether such treatment will be of permanent benefit, but recognize the importance of securing any degree of improvement in this troublesome disease.

A. G. B.

CHOMEREAU-LAMOTTE (B.). L'électrothérapie, sous forme de galvanisation bipolaire dans le traitement de l'éléphantiasis. [**Electrotherapy in the Form of Bipolar Galvanization in the Treatment of Elephantiasis.**]—*Rev. Méd. et Hyg. Trop.* 1930. Mar.-Apr. Vol. 22. No. 2. pp. 61-66.

The author at Guadeloupe has treated 4 recent and 7 old cases of chronic oedema of the lower or, rarely, the upper limbs by this method, with favourable results in all the early cases and some of the later. He describes and recommends his technique.

A. G. B.

QUIYUM (Md. Abdul). **A Case of Elephantiasis cured by Arrhenol.**—*Indian Med. Gaz.* 1929. Aug. Vol. 64. No. 8. p. 450.

An elephantiasis of the leg followed six months after an acute lymphangitis. Under six injections of arrhenol, given intravenously on alternate days, two of gr. ii and four of gr. iii, the hard painless non-pitting swelling had almost entirely disappeared. The blood was not examined.

Clayton Lane.

ALFREDO (João). La sclérose curative dans deux cas de varices lymphatiques. [**Curative Sclerosis in Lymphatic Varix.**—*Rev. Sud. Américaine de Méd. et de Chirurg.* Paris. 1930. July. Vol. 1. No. 7. pp. 689-691.

Like varicose veins, lymphatic vessels, the subject of permanent pathological dilatation, whatever the exciting cause of the enlargement may be, show structural alterations in their walls. In lymphatic varix consequently treatment by internal medication can never be followed by satisfactory results. Tumours dependent upon this condition have up to the present been dealt with surgically when necessary, but from the surgeon's point of view intervention is not always desirable and frequently presents difficulties. Favourable experience of curative sclerosis in the treatment of varicose veins has encouraged the author, a hospital physician at Pernambuco, to give this method a trial in two cases of lymphatic varix of the inguinal region, and of these he gives details. In both, though no measurements are noted, the tumours appear to have been of considerable size and to have corresponded with text-book description of varicose groin glands.

Treatment in the first case was commenced with a 10 per cent. solution of salicylate of soda in doses of 2 cc. injected locally. After the third injection, this dose was increased to 6 cc. of 20 per cent. solution. The total number of injections is not stated, but after a month the tumour had diminished in size, and was uniformly indurated throughout its whole mass. Seen a year later no signs of tumour were visible, and only on palpation could a slight local thickening be detected.

The second case was complicated by hernia, the cure of which was first effected. Treatment of the varix consisted of sixteen injections of 5 cc (strength of solution not given)—two injections weekly. When the patient was discharged from Hospital, the tumour was notably reduced in bulk, and hardened throughout. Two months later he was in excellent health, with the tumour showing still further shrinkage.

The salicylate solution may, it is stated, be injected alike into the vessels or the surrounding tissues, and the technique is said to be appreciably simpler than in the case of varicose veins. In the two instances reported the procedure employed was attended with no unfavourable symptoms or complications, either local or general.

J. J. Pratt.

BOYD (T. C.) & ROY (A. C.). **Chyluria : Some Biochemical Aspects.**—*Indian Jl. Med. Res.* 1929. Apr. Vol. 16. No. 4. pp. 973-985. With 4 graphs & 1 plate.

The author's conclusions are as follows :—

" (1) We have shown very fully the chemical constants of the fat present in cases of chyluria and that when on an ordinary hospital diet these constants vary to some extent. *

" (2) We have also found that when cod-liver oil is administered there is a great deviation in these chemical constants particularly in the iodine value, butyrefractometer value and melting point of the fat. In these respects the constants approach those of cod-liver oil.

" (3) We have failed to obtain any trace of liquid paraffin in the excreted fat when the diet contained this ingredient in the form of an emulsion with gum acacia.

" (4) We have also failed to find any optically active fat after the administration of hydnocarpus oil."

Clayton Lane.

SANNER. Les grosses hernies scrotales en pratique africaine. [**Large Scrotal Hernias in African Practice.**]—*Ann. de Méd. et de Pharm. Colon.* 1930. Jan.-Feb.-Mar. Vol. 28. No. 1. pp. 72-75. With 1 text fig.

The author comments upon the extreme frequency of large scrotal hernias amongst African races. He has found that in cases where the hernial sacs are at once voluminous (in capacity often exceeding several litres), and intimately and firmly adherent to surrounding structures text-book methods of radical cure are often difficult or impossible of application. Reserving classic procedures for simple cases, he divides those with which his paper deals into two classes :—

(a) Hernias in which the sac cannot be separated and obliterated, and the patient is old. Here he recommends Pauchet's method in which, after reduction of the hernia, the cord is tied "en masse" and the testicle sacrificed, with a view to the complete closure of the inguinal canal.

(b) Where the condition is similar but the patient young. In these his early operative steps differ from those of an ordinary radical cure only in the fact that no attempt is made to isolate the cord. The sac having been freely opened, its upper orifice leading into the abdominal cavity is surrounded by a purse-string suture, the stitches of which are so applied as to ensure that as much as possible of the chromic gut employed is outside the sac, care being at the same time taken to avoid inclusion of the vas deferens. Closure of the canal is then effected by Barker's method, the lower portion of the sac usually abandoned *in situ*, and the operation completed by prefunicular suture. Sometimes, however, the scrotal part of the sac can be dissected out with the aid of fine scissors. The author has practised this method with complete success in seven cases.

J. J. Pratt

i. JAMES (Wm. M.). **Do We see Gout in the Tropics ?**—*Eighteenth Ann. Rep. Med. Dept. United Fruit Company, Boston, Mass.* 1929. pp. 113-120. [9 refs.]

ii. GUARDIA G. (Tomas). **A Study of 980 Chemical Analyses of the Blood, with Special Reference to Hyperuricemia.**—*Ibid.* pp. 120-125.

i. After a description of gout as known for long in temperate climates, the author observes that true gout is so rare that in 24 years practice in Panama and the Canal Zone he has seen only two cases, both of them imported. In over 300,000 admissions to the Gorgas Hospital in 26 years only two cases of gout are recorded, one doubtful, and the other in a North American. Why true gout is so uncommon in the American tropics is obscure, but over 250 years ago SYDENHAM wrote "Travelling into southern countries is so effectual to conquer those diseases, the cure whereof is fruitlessly attempted in a colder climate."

ii. The author publishes tables, some by BERGLUND, others by himself, with a view to showing what relation, if any, exists between hyperuricaemia and certain symptoms which may or may not be due to gouty diathesis as seen in the American tropics, such as arthritis, paraesthesias (tingling, numbness, itching, coldness) and nodules in ears or elsewhere which might be taken for tophi. BERGLUND considers 6 mgm. uric

acid per 100 cc. of blood as the upper limit of normal. The tables fail to show the relation postulated. Where the uric acid concentration was above the limit, there was usually impaired renal function.

A. G. B.

BLANCHARD (M.). Les polysérites des indigènes coloniaux. [**Polyserositis of Natives of the Tropics.**].—*Rev. Prat. Malad. des Pays Chauds*. 1929. July. Year 8. Vol. 9. No. 7. pp. 303-306, 309.

In the African and Madagascan races which form the bulk of black troops in France, it is common to see several serous membranes attacked simultaneously or in succession by pathogenic organisms. These persons have acquired no immunity in childhood and hence are very susceptible to such infections and contract them violently. The form most frequently seen, whether primary or in succession to acute pneumococcal attacks, is that due to the tubercle bacillus. The usual syndrome is the glandular, with enlarged tracheobronchial and mesenteric glands, and the involvement of the pleura and peritoneum. The symptoms are described fully. The pericardium is the next serous membrane to be attacked. The author says that polyserositis, affecting pleura, peritoneum and pericardium, is a classical form of reaction of the black to the tubercle bacillus. Pneumococcal polyserositis almost always starts in the pleura, either during the development of the pneumonia or after defervescence. The effusion is often abundant enough to mask the pneumonia. Peritonitis and pericarditis follow. Meningitis is fairly common, arthritis not rare; the arthritis is always purulent and is usually localized to the knee and shoulder. Empyema after the pneumonia is rare. Rheumatism is a much less frequent cause of polyserositis than tubercle and pneumococcus, and is of a milder character: the pleurisy is the most painful of those seen in the black. This form of polyserositis yields readily to salicylates. Chylous polyserositis of filarial origin is rare, and is limited to the pleura and peritoneum. Polyserositis seen in grave cases of ankylostomiasis and in beriberi is also mentioned. Lastly, it is noted that the frequency of polyserositis in natives is the outcome of the septicaemic state so often seen in them.

A. G. B.

DE ALMEIDA (Miguel Ozorio). Contribuição ao estudo experimental da fisiologia pathologica do "mal de engasgo." [**Experimental Study of the Pathogeny of "mal de engasgo."**].—*Inst. Oswaldo Cruz. Supplemto das Memorias*. 1929. July 31. No. 9. pp. 146-151. [5 refs.]

This condition, which has repeatedly received notice in the *Bulletin*, is one of disturbance of deglutition from dysfunction of the oesophagus. Normally, the entrance of food causes peristaltic waves of contraction to pass until the food reaches the stomach. On section of the vagi in the neck, the presence of food results in peristalsis in the upper part of the oesophagus only, the lower part remaining flaccid and atonic till a large mass collects which presses on the trachea. If one vagus only was divided similar disturbance occurred at first, but soon passed off. The author, therefore, divided one vagus in dogs, and after an interval of 3 weeks some of the branches of the other. The result was the production of the clinical picture of "mal de engasgo." The dogs showed all the signs of hunger and ate ravenously, but the food accumulated in the lower part of the oesophagus

and might be rejected by vomiting. Death occurred in six weeks or so after progressive weakness and emaciation, in short, from starvation. It is not claimed that the condition is actually due to vagus interference, but seeing that the effect of the operations was to reproduce the clinical signs, it is hoped that this may help to throw light on an obscure problem.

H. H. S.

PEÑA CHAVARRIA (A.) & NAUCK (Ernest G.). *El rinoscleroma en Centro-América. [Rhinoscleroma in Central America.]*—Reprinted from *Rev. Méd. Latino-Americana*. 1929. Feb. Vol. 14. No. 161. 14 pp. With 9 text figs. [1 ref.] French summary p. 14.

According to the French resumé the authors note the great diffusion of rhinoscleroma in Central America especially in the higher and colder parts. In Costa Rica, whence they write, Indians are rare and the disease is equally so. They record two cases in Costa Ricans in which a combined treatment by X-rays and tartar emetic injections had a good result (photos). Frisch's bacillus was always present, in the deep parts of abstracted tissues. Surgical treatment had no success, but the medical treatment is advocated strongly.

A. G. B.

SHARPLES (L. R.). *The Conditions of "Burning Feet" or "Foot Burning" in Labourers on Sugar Plantations in the Corentyne District of British Guiana.*—*Jl. Trop. Med. & Hyg.* 1929. Dec. 16. Vol. 32. No. 24. pp. 358-360.

Burning feet or foot burning has been described by the author from labourers on sugar plantations. They are Hindus (Bengalis born in British Guiana) and the subjects are nearly always females between the ages of 17 and 40 years; it has never been noticed among Madras labourers. There is complaint of intense burning of the soles when walking with, in severe cases, a similar condition of the palms, especially the finger tips accompanied frequently by dimness of vision. Work has to be dropped for weeks at a time. Examination of the patient reveals nothing distinctive. Points on the soles are hypersensitive to touch and pin-prick. There is no paresis or wasting. The cause is believed to be dietetic deficiency. Polished rice is the staple food and, after cooking, superfluous water is thrown away. The Madras East Indian saves the water and flesh of sheep or goat is eaten at least once a week. The Chinese never suffer from this affection, and the author describes their system of cooking rice, whereby all the water is absorbed. Under a generous diet the patients rapidly improve. [No cause is suggested for the sex incidence. For previous papers see this *Bulletin*, Vol. 26, pp. 423-4.]

A. G. B.

CROLL (D. Gifford). *The Incidence of Chronic Nephritis amongst Young People in Queensland.*—*Med. Jl. Australia*. 1929. Aug. 3. 16th Year. Vol. 2. No. 5. pp. 144-145. With 1 chart in text.

NYE (L. J. J.). *An Investigation of the Extraordinary Incidence of Chronic Nephritis in Young People in Queensland.*—*Ibid.* pp. 145-159. With 5 text figs. [29 refs.] [Summary appears also in *Bulletin of Hygiene*.]

Dr. Croll brings out statistically (by tables and a chart) that 884 deaths in persons under the age of forty years from chronic nephritis were due, in Queensland, to an unknown cause, which either does not exist or does not operate to the same extent in the other States, during

the years 1917 to 1926 per 800,000 of population. These he regards as conservative figures. Dr. Nye takes up the tale and shows that the unknown cause referred to is lead poisoning contracted by children confined, as they are, on verandahs painted with white lead paint. What happens after the painting is that the siccative action of the sun dries up the oil and leaves the paint in the form of a chalky powder. The oil medium becomes oxidized by exposure to weather and sunlight.



Two brothers, aged 17 and 15; height, 145 centimetres (4 ft. 10 in.) and 138 centimetres (4 ft. 7½ in.) respectively; both nail-biters, and both having well-established chronic nephritis, but no previous history of lead poisoning.

[Reproduced from "A Study of Chronic Nephritis in Queensland," by L. J. JARVIS NYE.]

(Privately printed for the author by the Australasian Medical Publishing Co., Ltd., Sydney. 23 pp., 11 figs., 68 refs. 1930(?).)

The children, confined in the narrow space of the verandah, spend much time in holding on to the railings to watch the passing show, and thumb sucking and biting the nails are believed to do the rest. Moreover, when it rains children enjoy imbibing the drops underneath the rails. All this is proved by the findings in twelve cases of definitely proved lead poisoning in early life which are cited as examples.

The above are the essential facts of this paper and it will suffice to say that Nye discusses alternative possible causation of the chronic nephritis and describes the clinical symptoms and pathology of lead poisoning.

[J. L. GIBSON, it may be remembered, published a startling article (in so far as that he attributed the cases to this same cause) on "Plumbic

Ocular Neuritis in Queensland Children" (*Brit. Med. J.* 1908, Nov. 14, p. 1488). Dr. Nye does not, as he might have done, state that 2 milligrams of lead ($1/32$ of a grain) absorbed daily will in time cause chronic lead poisoning of which chronic nephritis is the most important sequela. His last words are "surely herein lies an extraordinary opportunity for preventive medicine." Recent inquiry shows that combinations of paint materials are more durable and resistant to the weather than if compounded of one material alone. Thus, if substitutes for the highly toxic white lead paint are demanded, if titanium white or paints on a zinc basis do not last, then mixtures of the two will. Although I have examined thousands of workpeople in factories coming into contact with lead compounds and have all the time been on the look-out for nail-biters, I was never able to satisfy myself that they showed greater evidence of lead absorption than those who were not.]

T. M. Legge.

ARMAND-DELILLE (P. F.), HURST (Arthur F.) & SORAPURE (V. E.). Hyperleucocytose éosinophilique d'origine tropicale chez l'enfant. [**Eosinophilia of Tropical Origin in the Child.**—*Bull. et Mém. Soc. Méd. Hôpit. de Paris*. 1930. May 19. Year 46. 3rd Ser. No. 16. pp. 768-773. [3 refs.]

Two cases are described. The first was that of a boy of 13 years born at Tahiti where he passed 8 years; he then went to Réunion, where he had malaria in 3 successive seasons. During his last year there he had attacks of urticaria and then of asthma. It was for this cause that he was brought to the senior author in France, where blood examination showed 76 per cent. eosinophiles. Examination of the stools at the Pasteur Institute revealed ascaris and oxyuris for which treatment was given. Later, trichuris infection was treated without effect on the eosinophilia. In 5 blood examinations the eosinophiles were 4 times 76 and once 85 per cent. (35,000 leucocytes).

The second case was in a boy of nine years, the second of a family of 7 children born in Venezuela where he lived to the age of 5 when he went to New York and then to France. He was there found to have an eosinophilia of 52 per cent. (leucocytes 22,000). Search of the stools for helminth ova was negative. The child was then taken to London to the second and third authors who confirmed the eosinophilia. Again no evidence of parasites in stools or blood was obtained. Liver and spleen were normal and X-rays revealed nothing. On other occasions the eosinophilia varied between 52 and 60 per cent. Examinations of day and night blood for filaria were negative. At the suggestion of the English authors the other members of the family were examined with the following findings:—

Names.		Eosinophiles per cent.
M. B. (father) ...	...	7, 6.
Mme. B. (mother) ...	...	5, 4.
Aloise B. aet. 11 ...	...	10, 6, 11, 14, 13.
John B. " 9 ...	...	5, 0.5 (New York), 53, 54, 51, 51, 52, 60, 60, 52, 37 (measles).
Priscilla B. " 8 ...	...	17, 14, 21.
Jimmy B. " 6 ...	...	27, 25, 19.
Jane B. " 5 ...	...	20, 27, 15.
William B. " 4 ...	...	4, 2.
Patricia B. " 2 ...	...	2, 2.2.

The parents and 5 children had lived in Venezuela ; the two youngest were born in New York. All were examined for parasites and on one occasion for *Strongyloides intestinalis* but without success.

The authors think that the cause is an undetected parasite [see also this *Bulletin*, Vol. 26, p. 543 DE LANGEN].

A. G. B.

HORN (L.) & KAUDERS (O.). Immunitätsstudien bei Malaria- und Recurrensinfektion. [**Immunity Studies in Malaria and Relapsing Fever.**]—*Klin. Woch.* 1930. Jan. 25. Vol. 9. No. 4. pp. 164–166. [12 refs.] [Psychiat. Clinic, Vienna.]

Incidentally, in the course of experiments the authors observed that the inoculation of mice with cerebrospinal fluid from cases of general paralysis treated by malarial therapy produced an inhibiting influence on a subsequently induced relapsing fever infection in these animals. This observation led them to investigate the matter systematically in a special series of experiments. [The species of treponema used in the experiments is not stated.] In the control experiments the cerebrospinal fluid from untreated cases of general paralysis and cases treated with typhoid vaccine to produce a rise of temperature was employed. They find that the most active immunizing action, both in the case of the cerebrospinal fluid and blood serum from cases of general paralysis treated with malarial therapy, develops during the febrile paroxysm, and the cerebrospinal fluid has a stronger immunizing action than the blood serum. The cerebrospinal fluid of control cases had no immunizing action against the spirochaetal infection. These interesting and important observations lead the authors to hope that they may be able to work out an immunity test method by preliminary immunization with body fluids taken during the febrile attack and subsequent inoculation of the animal with spirochaetes. By using such a method they hope to be able to evaluate experimentally the various methods of producing fever employed in the treatment of general paralysis.

E. D. W. Greig.

RHO (Filippo). **Testicular Extracts in the Topical Treatment of Various Ulcers.**—*Jl. Trop. Med. & Hyg.* 1930. Apr. 15. Vol. 33. No. 8. pp. 103–105. [31 refs.]

Professor Rho writes :—

“ In 1890, the Neapolitan surgeon, Aievoli, discovered for the first time that healing of long-standing ulcers was hastened by the application of thin slices of the testicles of guineapigs and rabbits.

“ In 1918, Voronoff obtained similar results of rapid healing by the use of testicular pulp. Later, numerous investigators in various countries obtained similar results by using simple testicular extracts. The author is able to confirm the accuracy of these statements by his own personal experience. He therefore calls the attention of tropical practitioners to the subject and suggests that this new method be given a trial in the treatment of various tropical ulcers.”

He suggests the trial of this method in septic ulcers caused by neglected wounds, in atonic chronic ulcers, and in diphtheroid ulcers, in each case after the application of bland antiseptics. He has used on his own person a glycerinated extract called “orchitasi,” prepared by Sero.

A. G. B.

DHUNJIBHOY (Jal Edulji). **A Brief Résumé of the Types of Insanity commonly met with in India, with a Full Description of "Indian Hemp Insanity" peculiar to the Country.**—*Jl. Mental Sci.* 1930. Apr. Vol. 76. No. 313. pp. 254-264. [5 refs.]

Excluding the Indian States the accommodation for mental patients in India roughly numbers 10,000, an extraordinarily low figure. According to the last census the proportion of the insane to the general population is 28 or 29 per 100,000 persons. This is probably a gross underestimate. The types of insanity appear to be much the same as those observed in the West. Among the toxic psychoses that due to hemp is the commonest. The psychosis is almost confined to the male sex and usually occurs between the ages of 20 and 40. Hemp is used in the forms of ganja, bhang and charas*. It is a very general custom to consume bhang on social festive occasions and its consumption is also in some places connected with religious rites. The effect of a moderate dose is to produce drowsiness, a dream state with a rapid flow of ideas, often of a sexual nature, and ultimately sleep. In larger doses there occur excitement, delusions, hallucinations, activity with a tendency to violence, ecstasy and deep sleep followed by forgetfulness of all but the initial symptoms. This is of importance from the medico-legal point of view. Three types of hemp insanity are met with: acute mania, chronic mania and dementia. The prognosis where the taking of the drug can be stopped is good. In acute cases nearly 90 per cent. and in chronic cases 40 per cent. recover. The drug can be stopped at once as no abstinence symptoms occur and for the rest symptomatic treatment only is required.

E. D. Macnamara.

FRANCO (Enrico Emilio). *Leishmaniosi viscerale e bilharziosi della vescica e del retto in un uomo di ventiquattro anni.* [**A Case of Visceral Leishmaniasis and Urinary Schistosomiasis.**]—Reprinted from *Boll. Soc. Ital. Med. ed Igiene Colon.* (Supplement to Fasc. 3 of *Giorn. di Clin. Med.*). 20 pp. With 5 figs. on 4 plates. [15 refs] [Inst. of Anat. & Path. Histology, Univ., Sassari.]

This is recorded as the first case of adult kala azar observed in Portugal. A negro, 24 years of age, came to hospital with enlarged liver and spleen and ascites. The mucous membranes were pallid, he was passing blood from nose, bladder and rectum, and had an ulcerative balanitis. He was born in Mozambique but was brought to Lisbon at the age of two years. L.D. bodies were found in a blood-smear, and in the large mononuclear and polymorphonuclear leucocytes. The patient was an alcoholic and had contracted syphilis at the age of 18. The enlargement of the liver was ascribed to a combination of the three conditions, alcohol, syphilis and kala azar. Laboratory examination of the urine had not revealed any schistosome ova, but a cystitis and proctitis due to *S. haematobium* were found at autopsy. The ova were found also in the renal tubules. A very full account of the post-mortem findings, macroscopic and histological, is given, but merely elaborates what is here stated.

H. H. S.

*Ganja is the dried plant which has flowered and from which the resin has not been removed. Bhang is the larger leaves and capsules with the stalks. Charas is the resinous matter collected separately. Ganja and charas are chiefly used for smoking, bhang is usually taken as a decoction.

TANZER (Francesco). Sull'influenza della spirochetosi da *Sp. hispanica* sulle tripanosomiasi da *Tr. equinum*, *Tr. brucei*, *Tr. evansi*. [**The Effect of *Treponema hispanicum* on Inoculated Trypanosomiasis.**]—*Arch. Ital. Sci. Med. Colon.* 1930. Feb. 1. Vol. 11. No. 2. pp. 91–103. English summary (5 lines) p. 103. [Inst. of Trop. Path., Univ., Bologna.]

The author injected rats with relapsing fever organisms and at various intervals thereafter, at the first febrile attack, or the second, or later, inoculated them with *Trypanosoma equinum*, *T. brucei*, and *T. evansi*. The results are presented in tabular form and are somewhat variable, but may be summarized by stating that the *Treponema hispanicum* has an inhibiting effect on the trypanosomes, delaying their development. If the two are inoculated together this is clearly seen, but if trypanosomes are injected after the second febrile exacerbation of the relapsing fever there may be no inhibition.

H. H. S.

BERRET (H.). Etude comparative entre le bérubéri et l'ankylostomiase. [**Comparison of Beriberi and Ankylostomiasis.**]—*Bull. Soc. Méd.-Chirurg. Indochine.* 1929. June. Vol. 7. No. 6. pp. 306–315. [14 refs.]

The author discusses the points of resemblance of beriberi, ankylostomiasis and malarial cachexia and expresses the opinion that if microscopic examinations were regularly made in Indo-China much beriberi would be transferred to one of the other disease-headings.

A. G. B.

SCHILLING (Claus). Der gegenwärtige Stand der Chemotherapie, besonders der Tropenkrankheiten. [**The Present Position of Chemotherapy with Special Reference to Tropical Disease.**]—*Deut. Med. Woch.* 1930. June 6. Vol. 56. No. 23. pp. 955–958. [Robert Koch Inst., Berlin.]

Recent observations have shown how important is the distribution of the remedy between the several organs of the body: e.g., quinine is first stored in the red corpuscles and then quickly disappears from the circulation; arsenic penetrates little into the central nervous system and therefore has small effect on parasites in the brain; bismuth is stored in the reticulo-endothelial system. Syphilis causes different body reactions in its various stages: at first fever, then in turn manifestations in the skin, gummata, tabes or G.P.; treatment must be adapted to these changes. The author suggests that this variation in reaction should be taken into account in the drug treatment of chronic trypanosomiasis.

Turning to the manner of action of the aetiotropic agent he notes that some act directly on the parasites, as certain dyes which cause the blepharoplasts of trypanosomes to disappear. The solvent is of importance; the author and GORETTI found that tartar emetic dissolved in normal serum is a much stronger trypanocide than when dissolved in water. KROÓ has recently shown that the concentration at which the remedy is introduced is of great importance; 0.2 gm. quinine was more effective in 200 cc. of normal salt solution than in 1 cc.; similarly with neo-salvarsan, which is explained by its more rapid oxidation in greater dilution (this *Bulletin*, Vol. 25, p. 494). Just as insoluble salts of mercury have been used in syphilis for their *depôt* action, so can germanin be employed; it is bound to the cells and yielded gradually to the body fluids. UHLENHUTH & SEIFFERT

have found that the repeated administration of doses below the curative are effective [*l.c.* Vol. 26, p. 672; see also Vol. 25, p. 343.]

The fact that some remedies inert *in vitro* are active *in vivo* can be explained by their conversion in the body into an active compound. Some organs may be less efficient than others in this respect; *e.g.*, parasites might be eliminated in the bone marrow where conversion was energetic, and spared in the lymphatic glands where it was less effective; the parasites which were spared would initiate a relapse.

The indirect action of a remedy may come about through the mobilization of protective substances normally present. Such are some of the points of an interesting paper.

A. G. B.

GIEMSA. Neuere Ergebnisse der Chemotherapie. [**Recent Developments in Chemotherapy.**]—Reprinted from *C.R. Congrès Internat. de Méd. Trop. et d'Hyg., le Caire, Egypte. Dec. 1928. Vol. 2. pp. 299–307.*

This lecture, and the discussion which followed it, deal with synthetic drugs introduced in recent years for the treatment of tropical diseases and cover ground with which readers of this *Bulletin* are already familiar.

T. A. Henry.

ROSENTHAL (Sanford M.) & VOEGTLIN (Carl). **Biological and Chemical Studies of the Relationship between Arsenic and Crystalline Glutathione.**—*Jl. Pharm. & Experim. Therap.* 1930. July. Vol. 39. No. 3. pp. 347–367. With 1 fig. & 4 charts in text. [15 refs.] [*Hyg. Lab., U.S. Public Health Service, Washington.*]

The authors have thought it desirable to repeat and extend the work done by VOEGTLIN, DYER and LEONARD (this *Bulletin*, 1924, Vol. 21, p. 414) using for that purpose the crystalline reduced glutathione, now available by the methods of Hopkins and of Kendall, instead of the amorphous material of the former investigations.

It is again shown, by *in vitro* experiments, that glutathione is able to protect trypanosomes against the toxic action of either arsenious acid (white arsenic) or 3-amino-4-hydroxyphenylarsenious oxide; protection against the latter is complete when the concentration of glutathione is 10 times that of the arsenic compound; but even more is needed against arsenious acid, though the latter has only 1/200 the trypanocidal activity of the former. The protected trypanosomes are not only motile, but also infective for rats. Rats are also protected against the same two arsenic compounds by previous injection of glutathione, acute toxic reactions being prevented. Similarly, the local inflammation produced by subcutaneous injection of arsenic solutions is inhibited if the solutions also contain glutathione. The two arsenic compounds do not inhibit the oxidation of reduced glutathione by molecular oxygen in the presence of haemin, as an iron catalyst, unless the arsenic is present in concentration nearly equal to that of glutathione. The experimental data available relating to the mechanism of the action of arsenic on living organisms are discussed and the view is put forward that the action of trivalent arsenious oxides on certain living cells involves a chemical reaction with reduced glutathione, and possibly with other reduced sulphur compounds of protoplasm.

T. A. Henry.

CHOPRA (R. N.) & CHOUDHURY (S. G.). **The Rôle of Surface Tension on the Activity of Cinchona Alkaloids.**—*Indian Jl. Med. Res.* 1929. Oct. Vol. 17. No. 2. pp. 360-365. With 1 graph in text. [13 refs.] [School of Trop. Med. & Hyg., Calcutta.]

Measurements of the surface tension of solutions of quinine at concentrations 1 in 4,564, 1 in 10,000 and 1 in 41,250 show that this constant decreases as the value of the pH is increased by the addition of a suitable buffer solution. The authors have pointed out previously that in the administration of quinine this implies that in presence of alkali there will be greater concentration of alkaloid at the interface where adsorption takes place, and this explains ACTON and Chopra's observation that the concentration of quinine in mesenteric blood can be nearly doubled by administration in presence of alkali. Apart from this lowering of surface tension it is possible that in presence of free hydroxyl ions the negative charge of cells is increased and so induces greater adsorption of the positively charged alkaloid.

T. A. Henry.

- i. GOODSON (J. A.) & HENRY (T. A.). **The Assay of Mixtures of Cinchona Alkaloids.**—Reprinted from *Pharmaceutical Jl.* 7 pp. [1 ref.]
- ii. — & —. **The Composition of Cinchona Febrifuge.**—*Quarterly Jl. Pharm. & Pharmacol.* 1930. Apr.-June. Vol. 3. No. 2. pp. 238-248. [13 refs.] [Wellcome Chemical Research Labs., London.]

i. This paper deals with the composition of the total alkaloids of five samples of cinchona bark from Tanganyika Territory. The barks were of two types, viz., two *Cinchona succirubra* barks and three hybrid barks, presumably from *C. succirubra* and *C. Ledgeriana*. In the latter the proportion of quinine to cinchonidine is normally about 5 to 1, but in one of these three specimens, the proportions, determined by Howard and Chick's process, were about equal, as they usually are in *C. succirubra* bark, though the total alkaloids were higher, viz., 10.2 per cent. as against 7 to 8 in *C. succirubra* bark. Detailed examination of the alkaloids in this anomalous specimen showed that the percentages of quinine and cinchonidine were 3.07 and 2.05 per cent. respectively, and hence it is concluded that in this particular bark, the influence of the *C. succirubra* stock was dominant over that of the *C. Ledgeriana* graft.

ii. The paper begins with a critical examination of the published analyses of nine samples of cinchona febrifuge, 5 Indian, 2 Javanese, and 2 European in origin. Of these, 2 belong to the "quinetum" type, and contain about 80 per cent. of crystallizable alkaloids, 5 are of the "cinchona febrifuge" type and contain about 50 per cent. of crystallizable alkaloids and 2 are below this standard, and are perhaps of the type described by MACGILCHRIST (*Indian Jl. Med. Research* 1914-15, Vol. 2, p. 336) as "residual alkaloid."

The authors examined three febrifuges; two (A and B) supplied by the Health Section of the League of Nations and one (C) purchased in London. The analyses were made in the first instance by the Howard and Chick process and subsequently by Chick's recent modification of this process. The crude "quinine sulphate," "cinchonidine tartrate,"

"quinidine hydriodide" and "cinchonine" obtained in these processes were examined by determinations of methoxyl and optical rotation and in this way corrected values for the four alkaloids obtained. The final results are as follows:—

	A.	B.	C.
Quinine	15.6	1.8	5.5
Cinchonidine	16.9	1.5	4.7
Quinidine	3.9	4.3	5.4
Crystallizable cinchonine	15.5	17.5	36.2
Total crystallizable alkaloids ...	51.9	25.1	51.8
Amorphous alkaloids (Quinidine) ...	32.6	58.8	38.4
Ash	10.3	4.5	2.8
Moisture	3.9	7.3	1.8
Organic impurities, (by difference) ...	1.3	4.3	4.9

It is considered that Chick's modification of the Howard and Chick process gives reasonably good results for quinine, cinchonidine and quinidine, when the allocation of the fractions is checked and corrected by these means, but there is as yet no satisfactory method for estimating cinchonine and in the present instance, the amount of pure cinchonine which can be crystallized out of the crude fraction is recorded. Samples A and C are to be regarded as cinchona febrifuges proper, but B is below standard and should be classed as "residual alkaloids."

T. A. Henry.

DAWSON (W. T.) & GARBADE (Francis A.). **Idiosyncrasy to Quinine, Cinchonidine and Ethylhydrocupreine and Other Levorotatory Alkaloids of the Cinchona Series: Preliminary Report.**—*Jl. Amer. Med. Assoc.* 1930. Mar. 8. Vol. 94. No. 10. pp. 704-705. [11 refs.] [Pharmacol. Dept., Univ. of Texas, Galveston.]

One of the authors having exhibited symptoms of quinine idiosyncrasy, the opportunity has been taken to try his susceptibility to laevorotatory and dextrorotatory series of cinchona alkaloids by means of Boerner's skin test.* Idiosyncrasy proved to be present in general to the laevo- but not to the dextro- forms: i.e., it was exhibited, e.g. with quinine and cinchonidine, but not with quinidine or cinchonine. Prior injections of adrenalin did not modify the effects. There were a number of exceptions; thus idiosyncrasy was present to ethylhydrocupreine, but not to isoamylhydrocupreine (eucupin), isooctylhydrocupreine (vuzin), or 5-nitrohydroquinine, though these and others, also inert, are laevorotatory. In these exceptional cases the dextro-isomerides, where they were tried, were also unable to produce symptoms. The results of the skin tests were confirmed by oral ingestion of quinine and cinchonidine, which produced symptoms, and of quinidine and cinchonine which did not. It is suggested that before administering

* Quinine bisulphate, preferably in dilution of 1:10, is applied to a scarification. In susceptible persons oedema and erythema result, reaching a maximum in 15 minutes (*Jl. Amer. Med. Assoc.* 1917, Vol. 68, pp. 907-8.)

ethylhydrocupreine in pneumonia or quinine intravenously, Boerner's skin test should be used. In two other cases in which quinine had produced urticaria the application of Boerner's test gave negative results with quinine, quinidine, cinchonine, and cinchonidine. A positive Boerner's test would probably imply that a patient would experience great discomfort from administration of the drug, but a negative result does not mean that urticaria may not occur. Information supplied by manufacturers indicates that in practice there is complete separation of the laevo- and dextro- rotatory alkaloids and a number of previous instances are quoted in which cinchonine or quinidine has been substituted successfully for quinine in the treatment of malaria.

T. A. Henry.

DAWSON (W. T.) & GARBADE (Francis A.). **Idiosyncrasy to Quinine, Cinchonidine and Ethylhydrocupreine and Other Levorotatory Alkaloids of the Cinchona Series : Further Chemical Delimitation of the Idiosyncrasy ; Alteration in Sensitiveness.**—*Jl. Pharm. & Experim. Therap.* 1930 Aug. Vol. 39. No. 4. pp. 417-424. [22 refs.] [Med. School, Univ. of Texas, Galveston.]

This is a continuation and extension of work already reviewed. (See above). Quitenine, produced by the oxidation of the vinyl group of quinine to a carboxyl group gave negative results, but on esterification of the carboxyl group, e.g., in ethyl-, *n*-amyl-, and *iso*amyl- quitenines, activity is recovered and all these gave positive tests. In the previous paper it was recorded that ethylhydrocupreine gave positive and amylhydrocupreine negative results. The two intervening homologues, *isopropyl*- and *isobutyl*- hydrocupreines, have now been tried and found active, the amyl- homologue being still inactive (January 9 or 11, 1930). On repeating the comparative test on March 20th, 1930, the amyl- homologue proved active but less so than the *isobutyl* compound. This appears to be due to increased sensitivity of the subject, in whom headache ensued in a few minutes after the test on March 20th, whilst formerly it did not develop until 2 or 3 hours after the tests. It is interesting to note that activity appears to cease beyond amylhydrocupreine, since the *n*-hexyl, *isooctyl* and *n*-dodecyl- homologues all gave negative results on March 20th.

Cupreine and apoquinine both proved active, but 5-nitro- and 5-amino- hydroquinine gave negative results, though they are both laevo-rotatory. Quinamine, like all the dextro-rotatory cinchona alkaloids tried, was inactive. Quinoline gave a positive result whilst "plasmaquin" (N-diethylamino*isopentyl*-8-amino-6-methoxyquinoline) gave a negative test. Quinicine and cinchonicine gave positive tests even with normal subjects and it is suggested that these amorphous alkaloids are possibly the cause of the "quinine eczema," which sometimes occurs among workers in quinine factories. Sensitivity to quinine, in the particular subject studied, is considerable; a narrow, but recognizable wheal is produced by a 1 in 5,000 solution of the hydrochloride, whilst a saturated solution of quinine base (1 in 1,500) gives a wheal of about the same width as a 1 per cent. solution of the hydrochloride. Histamine solution (1 in 1,000) produces in this subject, as in normal persons, a whitish wheal surrounded by a zone of erythema.

T. A. Henry.

MANOUSSAKIS (E.). Une méthode pour éviter les troubles quinquiques de nature idiosyncrasique. [**A Method of overcoming Quinine Idiosyncrasy.**—*Bull. Acad. Méd.* 1930. Apr. 29. 94th Year. 3rd Ser. Vol. 103. No. 17. pp. 458-461.]

The author briefly records 4 cases of quinine idiosyncrasy, all in soldiers. In two it took the form of fever and erythema so intense that the diagnosis of malignant scarlatina was at first made. One patient became dyspnoeic with dusky extremities and oedema of head and limbs. The other two developed haemoglobinuria after small doses, and in one of these this had been the invariable sequel, so that his malaria was left untreated. The author at first tried chloride of calcium and adrenalin and then the method of very small doses of quinine, but without effect. He then tried mixing the dose with the patient's blood before administration. He found that if 0.20 gm., a quantity which had caused violent symptoms, was mixed with the blood 10 hours before injection, no disturbing symptom followed. The blood of another subject was ineffective and when an interval of 3 days occurred between doses the symptoms recurred.

It was requisite that all the quinine of the preceding dose should not have been eliminated. As long as administration was daily there was perfect tolerance. The secret of dealing with such cases is to give each dose before the previous one has been all excreted.

A. G. B.

i. FOURNEAU (E.), TRÉFOUEL, M. & Mme., STEFANOPOULO (G.), BENOIT (G.), DE LESTRANGE (Y.) & MELVILLE (Kenneth I.). Contribution à la chimiothérapie du paludisme. Essais sur la malaria des canaris. [**Contribution to the Chemotherapy of Malaria. Experiments on the Malaria of Canaries.**—*Ann. Inst. Pasteur.* 1930. May. Vol. 44. No. 5. pp. 503-533. [51 refs.] [Pasteur Inst., Paris.]

ii. —, — & BENOIT (G.). Préparation de dérivés en vue d'essais thérapeutiques. I. Amino-alcools. II. Dérivés de l'atophan. III. Dérivés du carbostyryle. IV. Dérivés quinoléiniques et quinoléine arsinique. [**Preparation of Compounds for Therapeutical Experiments. I. Amino-alcohols. II. Derivatives of Atophan. III. Derivatives of Carbostyryl. IV. Derivatives of Quinoline and Quinoline-Arsinic Acids.**—*Ibid.* June. No. 6. pp. 719-751. [Refs. in footnotes.]

i. The paper begins with a discussion of bird malaria as a means of comparing and testing anti-malarial drugs. It is pointed out that the one relatively constant factor is the length of time which elapses before malarial parasites appear in the blood of birds, when they are all infected with the same parasitized blood. Out of 200 birds infected, 80 per cent. showed parasites between the 3rd and 8th days and 20 per cent. after the 8th day; 2 proved to be carriers and never showed parasites, whilst 12 developed mild infections (infections larvées). Of the 47 birds not used for tests, 35 finally retained a latent infection and 12 died. From this preliminary study it is concluded that bird malaria may follow either of the following courses: (a) Rapid increase of the number of parasites to 30 to 80 per field in the course of 4 to

10 days ; this violent infection may last 5 to 10 days leading either to the death of the animal or ceasing abruptly and leaving the bird a carrier, or (b) a mild infection may develop in which the number of parasites varies from 1 per 100 fields to 1 per 2 fields or rarely 1 per field, and this state may last 4 or 5 days or months. This kind of infection is useless for chemotherapeutical work and usually supervenes on an early progression such as the following : 1st day, 1 per 100 fields ; 2nd day, 1 per 10 fields ; 3rd day, 1 per field.

The activity of a drug is not proportional to the dose given and is repressive rather than definite. In no case has a cure been observed. Birds apparently cured may show no parasites in the blood for months, though they retain some, which may either produce a violent attack or subside into a latent infection.

In the actual trials, infection was made by the Sergeants' method, and the drugs were administered either subcutaneously (Edm. and Et. SERGEANT) or orally (a modification of ROEHL's method). Both "curative" and "preventive" trials were carried out. Comparative trials were first made of drugs of known anti-malarial value, viz., plasmoquin, quinine hydrochloride, quinine-stovarsol and methylene-blue.

The detailed protocols in the original should be consulted, but the following points of general interest may be quoted. The dosage figures are in milligrams. Plasmoquin, subcutaneously, begins to show some effect at a dose of 0.004 and the smallest dose leading to the final latent infection is 0.06. For quinine and quinine-stovarsol the smallest doses producing latent infection are 0.5 and 0.1, respectively, for the curative method by the mouth, and 0.25 and 0.5 for the preventive method by the mouth. Applied subcutaneously and curatively; for quinine 0.5, quinine-stovarsol 0.8 ; subcutaneously and preventively : quinine 0.2, quinine-stovarsol 0.8 ; for methylene blue the results are inconclusive.

A list, with constitutional formulae, of an extensive series of synthetic compounds prepared by the authors and tried in bird malaria is given. This list is of great interest to workers in chemotherapy, but there is no point in reproducing it here. Most of these compounds gave negative results, but a few showed slight action and, therefore, merit further attention as points of departure for new synthetic work.

Among known compounds stovarsol, parosan oxide, *m*-aminophenylstibinate of sodium, Bayer 205, mercurochrome, harmine, pyrethrin and chinosol, some of which have been used in human malaria, proved inactive.

ii. In this paper, which is of purely chemical interest, the authors deal with the preparation of the various compounds used in the bird malaria trials described in the first paper reviewed above.

T. A. Henry.

NAG (S. C.). **Quinine "Addiction."**—*Indian Med. Gaz.* 1930. June. Vol. 65. No. 6. p. 330.

Two cases are briefly described in which an interruption of the habit of taking a 5 grain quinine tablet daily at tea time, was followed by headache and uneasiness, and in one case "feverishness," relieved by resumption of the quinine.

A. G. B.

ROBERTS (M. A. W.). **Case of Death under Anaesthesia following Prolonged Administration of Antimony Salts.**—*Kenya & East African Med. Jl.* 1930. May. Vol. 7. No. 2. pp. 54-55.

The case of a native under operation for piles just after completing a course of $19\frac{1}{2}$ grains of antimony tartrate for schistosomiasis. He collapsed after half a drachm of chloroform. The author attributes the death to the depressant effect of antimony, but the editor suggests that the chloroform may have deteriorated.

A. G. B.

CAWSTON (F. G.). **Intravenous Injections of Tartar Emetic.**—*Kenya & East African Med. Jl.* 1930. Jan. Vol. 6. No. 10. pp. 309-310.

The author prefers potassium to sodium in the use of salts of antimony for schistosomiasis. For school children he dissolves $1\frac{1}{2}$ grains of tartar emetic with an equal quantity of sodium chloride in 3 cc. of boiling water just before injection; toxic effects are rare.

A. G. B.

MACMAHON (H. E.) & WEISS (S.). **Carbon Tetrachloride Poisoning with Macroscopic Fat in the Pulmonary Artery.**—*Amer. Jl. Path.* 1929. Nov. Vol. 5. No. 6. pp. 623-630. With 9 figs. on 2 plates. [11 refs.] [Boston City Hosp. & Harvard Med. School, Boston.]

A labourer was admitted semicomatose to hospital with abdominal pain, persistent nausea, vomiting and jaundice. For 4 years he had had periodical alcoholic debauches, the usual beverages being "Noonan's Hair Petrol" and denatured alcohol. Three days before admission he drank about an ounce of "Carbona" (carbon tetrachloride) in milk. In hospital he became completely comatose and died after 48 hours. Autopsy was performed six hours later.

"1. The gross and microscopic findings are described in an unusual case of carbon tetrachloride poisoning in which the blood in the right side of the heart and larger pulmonary arteries contained an extremely high percentage of fat (60 per cent.).

"2. The severe damage to the liver, which was already large and filled with fat, was the probable source of the fat in the vascular system.

"3. Fat droplets that were small enough to pass through the capillaries of the lung and to gain entrance into the capillaries of other organs produced no microscopic lesions in either the heart, brain or kidney.

"4. It appears from these observations that the sensitiveness of alcoholic patients to carbon tetrachloride is increased not only because of increased absorption of the drug, as well as the synergistic action of alcohol and carbon tetrachloride together in producing liver damage, but also because of the possible presence of pre-existing liver damage."

A. G. B.

LANE (Clayton). **Fatal and Medicinal Doses.** [Correspondence.]—*Lancet.* 1930. June 14. p. 1317.

Draws attention to the fact that though 1.5 cc. of carbon tetrachloride has proved fatal the dose advised and widely used in hookworm infection is 3 cc. This "has naturally killed a varying proportion of those who have taken it." Moreover, some of these persons were probably not in need of treatment, being the victims of herd treatment without individual diagnosis. Colonel Lane would give no treatment without demonstration of infection.

A. G. B.

ANDERSON (Hamilton H.) & LEAKE (Chauncey D.). **The Oral Toxicity of Emetine Hydrochloride and Certain Related Compounds in Rabbits and Cats.**—*Amer. Jl. Trop. Med.* 1930. July. Vol. 10. No. 4. pp. 249–259. [14 refs.] [Med. School, Univ. of California, & Pacific Inst. of Trop. Med., Hooper Foundation for Med. Research, San Francisco.]

This paper forms part of an extended study of the chemotherapy of amoebiasis. The authors have been unable to find any reports on the oral toxicity of emetine in animals. One hundred rabbits and 60 cats were used in these experiments. They found approximately the same lethal range for single doses of emetine by mouth in rabbits and in cats and it agreed fairly well with the figures given by workers on single subcutaneous injections. This indicates fairly complete absorption from the alimentary tract. Excretion appears to be extremely slow, so that if continued administration is necessary the dose should become progressively smaller. Examination of animals that died revealed degenerative injury to cardiac and smooth muscle and to liver and kidney.

A. G. B.

CASTEN (Virgil). **Tryparsamide Amblyopia treated by "Forced Drainage" of the Cerebrospinal Fluid.**—*New England Jl. of Med.* 1930. Apr. 3. Vol. 202. No. 14. pp. 676–678. With 2 text figs. [10 refs.] [Massachusetts General Hosp., Boston.]

"An analysis of 1,254 cases of neurosyphilis treated with tryparsamide showed about 2 per cent. had permanent visual damage. It is well known that arsenic appears in the spinal fluid following the intravenous injection of tryparsamide and is presumed that it directly affects the optic nerve by way of the subvaginal space. On the development of serious visual disturbances, an attempt should be made to remove the toxic substance. Kubie's method of "forced drainage" in central nervous system infections has been used with a good result to both vision and hearing. "Forced spinal fluid drainage" probably has definite value as a therapeutic agent in patients with acute amblyopia due to tryparsamide."

"Forced drainage" consists in the administration during lumbar puncture of hypotonic fluids orally, subcutaneously or intravenously: an abundant additional flow of c.s.f. is produced without distress or other drawback. A case is detailed in which this method was applied, with apparently marked success.

A. G. B.

CHOPRA (R. N.). **A Retrospect of Six Years' Research Work on the Indian Indigenous Drugs.**—*Far Eastern Assoc. Trop. Med. Trans. Seventh Congress, British India, 1927.* Vol. 3. pp. 543–551. [17 refs.] [School of Trop. Med. & Hyg., Calcutta.]

Six years ago, when the Calcutta School of Tropical Medicine was opened, a chair of experimental pharmacology was established for the first time in India. One of the duties allotted to the professor was to make a thorough study of the drug-yielding plants of the country, to isolate the active principles and work out their pharmacological action. Here the occupant of the post gives a retrospect of this work. The problem presented two aspects: (1) The large group of drugs of known value, recognized in the pharmacopoeias of Europe and growing wild or cultivated in India; these required study to see if their quality equalled that of the plants used in the pharmacopoeias; (2) plants of allied species which might form substitutes for the imported remedies.

Instances are given in the present paper, e.g., *Digitalis purpurea*. The author found that many over-sea preparations on the market, for climatic or other reasons, lost 20 to 40 per cent. of their efficiency during transit and storage. *Digitalis* has been introduced to India and grows well in the Himalayas. The Indian product proved to be at least as good as the European and is gradually coming into use. *Psychotria ipecacuanha* of good quality can be grown in the Himalayas yielding excellent emetine both qualitatively and quantitatively. The emetine from this source is now on the market. *Artemesia brevifolia* grows abundantly in the Himalayas and Hindukush and was found to give a good yield of santonin, of just as good quality as the Russian which is now hard to obtain. Kashmir can produce enough santonin for India with a surplus for export.

Another branch of the work is the investigation of some of the well known remedies used in the indigenous systems of India. Here, the common weed, *Boerhaavia diffusa*, was found useful in ascites and kidney conditions, producing marked and persistent diuresis. *Saussurea lappa* (Kuth root), growing in the Himalayas near Kashmir, was found to be an excellent remedy in spasmodic conditions of the respiratory tract. The extract not only cuts short attacks of asthma, but reduces their frequency. *Holarrhena antidysenterica*, growing abundantly through the dry forests of India, yields conessine, which has a remarkable effect on *E. histolytica in vitro*. It is effective in dilution or 1 in 280,000 as against the 1 in 200,000 of emetine.

These are but examples.

A. G. B.

- i. MHASKAR (K. S.) & CAIUS (J. F.). **A Study of Indian Medicinal Plants. II.** *Gymnema sylvestre*, Br.—*Indian Med. Res. Memoirs. Supplementary Series to Indian Jl. Med. Res.* 1930. Mar. Memoir No. 16. pp. 1-49. With 1 map, 1 plate, 2 charts & 20 graphs. [41 refs.]
- ii. CAIUS (J. F.), MHASKAR (K. S.) & ISAACS (Mozelle). **A Comparative Study of the Dried Barks of the Commoner Indian Species of Genus Terminalia**, Linn.—*Ibid.* pp. 51-75. With 25 graphs on 9 plates. [10 refs.] [Haffkine Inst., Bombay.]

i. In this Memoir from the Pharmacological Laboratory of the Haffkine Institute, Bombay, the authors treat their subjects fully. Here it will be sufficient to note their practical conclusions.—The leaves of *Gymnema sylvestre* given either by mouth or injections cause hypoglycaemia which is never excessive. The drug acts indirectly through stimulation of the insulin secretion of the pancreas. It may be used to check glycosuria in doses of 2 to 4 grams of dry leaf.—The plant is an Asclepiadaceous climber common in many parts of India and in Tropical Africa. That chewing the leaves destroyed the taste of sugar has been known for 100 years.

ii. The conclusions of the second paper are as follows :—

“The pharmacodynamically active barks of the commoner Indian species of *Terminalia* are either : (i) mild diuretics—*T. Arjuna*, *T. belerica*, *T. pallida*—, or (ii) fairly potent cardiac stimulants—*T. bialata*, *T. coriacea*, *T. pyrifolia*—; or (iii) have both diuretic and cardiotonic properties—*T. Catappa*, *T. Chebula*, *T. citrina*, *T. myriocarpa*, *T. Oliveri*, *T. paniculata*, *T. tomentosa*.”

A. G. B.

GANORA (Romualdo). Vocabolario di termini arabi ed etiopici riguardanti la medicina e la flora medica. [**List of Medical and Botanical Terms in Arabia and Abyssinia.**—*Arch. Ital. Sci. Med. Colon.* 1930. June 1. Vol. 11. No. 6. pp. 348–374.]

This is a vocabulary drawn up for the use of Italians practising in Arabia, Abyssinia and the district, giving the Italian equivalent of many of the diseases, symptoms etc., and of drugs which they are likely to meet with or need to use in the course of their work. Useful doubtless, but of limited scope, as many names have to be expressed by paraphrases.

H. H. S.

KELLY (Francis Charles) & HENDERSON (John McAskill). **The Influence of Certain Dietary Supplements on the Nutrition of the African Native. I.**—*Jl. Hygiene.* 1930. Feb. Vol. 29. No. 4. pp. 418–428. With 3 text figs. [11 refs.]

HENDERSON (John McAskill) & KELLY (Francis Charles). **The Influence of Certain Dietary Supplements in Relation to the Calcium Requirements of Growing African Natives. II.**—*Ibid.* pp. 429–438. With 2 text figs. [8 refs.]

— & —. **A Note of the Influence of the Addition of Certain Supplements to the Diets of African Natives. III.**—*Ibid.* pp. 439–442. With 1 fig. [4 refs.] [Summary appears also in *Bulletin of Hygiene.*]

A series of investigations carried out in connexion with the importance of the supply of accessory food factors and mineral salts in the nutrition of the African native. The experimental subjects were selected from the growing boys and adult prisoners serving long-term sentences in Nairobi prison, Kenya Colony. The papers, which are concerned chiefly with the deficiencies of the routine diet of the prisoners more especially in calcium, may be conveniently dealt with together. Most of the subjects on this diet were found to be receiving less than the maintenance allowance of calcium. They were, as a result, continuously losing the element from their bodies in varying amounts, occasionally as much as 0.29 gm. per day. A few of the subjects, however, were found to be in calcium equilibrium on the prison diet (which contained 0.3 gm. of the element per day), and only occasionally showed negative balances. The most striking improvement in calcium balance was obtained when milk (0.77 gm. calcium) was added to the diet of the growing boys. In one case, for instance, this supplement changed a negative balance of -0.1 gm. calcium per day into a positive balance of 0.5 gm. per day. The addition of mineral salts (closely allied in composition to the ash of cow's milk), either with or without cod-liver oil, caused a marked improvement in the calcium balance, whereas cod-liver oil alone (15 cc. per day) produced no appreciable improvement. "Where the calcium intake is low the most valuable addition that can be made is one of calcium itself." Their findings emphasize "the futility of adding a calcium absorption promoting vitamin in the absence of an adequate calcium intake. Indeed, where there is a pressing demand for calcium the furnishing of an adequate amount in the food, with or without increase in the vitamin content, would seem to meet the needs of the case."

A. F. Watson.

LEMAIRE (E.). Le colorant de Giemsa original pour l'hématologie. [**The Original Giemsa Staining in Haematology.**]—*Rev. Méd. et Hyg. Trop.* 1930. Jan.-Feb. Vol. 22. No. 1. pp. 34-36.

GIEMSA used originally two watery solutions. These had the composition: No 1, Eosin B extra Grüber 0.05 gm; neutral distilled water 1 litre; No 2, Azur II Grüber 0.80 gm.; neutral distilled water 1 litre. They are mixed in the proportion of 8.5 cc. No. 1 and 1.5 cc. No. 2. Blood films are fixed in absolute alcohol for not more than one minute, if granules are to be well defined; stained in the mixture for 30 to 60 minutes; washed in boiled distilled water and dried in air.

The advantages of the method are its cheapness and the absence of any traces of precipitate.

W. F. Harvey.

LEGER (Marcel). Brèves considérations sur les procédés de séro-floculation dans les maladies tropicales. [**Notes on Sero-Flocculation Methods in Tropical Diseases.**]—*Bull. Soc. Path. Exot.* 1930. Jan. 8. Vol. 23. No. 1. pp. 31-34. With 2 text figs.

These notes refer to the many serum-flocculation procedures which have been devised as means of diagnosis of tropical and other diseases. They are all of the type of colloidal precipitation reactions and necessitate the establishment of quantitative differences between test sera and normal sera. The author strongly recommends the use of instruments of precision in the measurement of these differences.

W. F. Harvey.

GORDON (R. M.) **A Counting Apparatus for Use with the Microscope.**—*Ann. Trop. Med. & Parasit.* 1930. Apr. 7. Vol. 24. No. 1. pp. 81-84. With 1 text fig. & 1 plate. [Sir Alfred Lewis Jones Research Lab., Freetown, Sierra Leone.]

The author describes an apparatus by which, with two revolution counters of the type used commercially for attachment to revolving drums and a watch spring stop, successive numbers are added to a recording dial on turning one spoke into the next position. It is only intended for record of two sets of figures.

W. F. Harvey.

RUBINSTEIN (P. L.) & GOLUBEWA (E. E.). Ueber eine noch unbekannte Funktion des retikuloendothelialen Systems. X. Der vikariierende Ersatz der Milzfunktion in dem chemotherapeutischen Effekt. [**Vicarious Replacement of Splenic Function in Chemotherapy.**]—*Ztschr. f. Immunitätsf. u. Experim. Therap.* 1930. Vol. 66. No. 1/2. pp. 1-7. [7 refs.] [Microbiol. Research Inst., Education Commissariat R.S.F.S.R., Moscow.]

In former papers from the Moscow Laboratory it had been shown that salvarsan failed to sterilize splenectomized mice infected with *T. recurrentis* in 77 per cent. of cases as against 9 per cent. only of normal mice.

The present communication deals with the effect of germanin on the course of trypanosome infection (*T. equiperdum*) in mice whose spleens were removed at various intervals before the experimental infection, viz., 24 hrs. before to 53 days before. The results revealed the fact that as the time between splenectomy and infection increased, the

sterilizing effect of germanin increased, thus indicating that the cells of the R.-E. system outside the spleen were able to assume compensatory functions.

						Per cent.
Spleen removed	24 hrs. before infection.	Germanin sterilized in	28.6			
"	" 7 days "	" "	38.5			
"	" 23 " "	" "	92.4			

J. C. G. Ledingham.

RUBINSTEIN (P. L.). Ueber die Natur der Immunität beim Rückfallfieber. XII. Ueber die Bedeutung des retikuloendothelialen Systems beim experimentellen Rückfallfieber der Kaninchen. [**The R.E. System in Experimental Relapsing Fever in Rabbits.**]—*Ztschr. f. Immunitätsf. u. Experim. Therap.* 1930. Vol. 65. No. 5/6. pp. 538-542. [6 refs.] [Microbiol. Research Inst., Education Commissariat R.S.F.S.R., Moscow.]

The author, being satisfied that he and his colleagues had clearly demonstrated the severe and lethal nature of *recurrentis* infection in splenectomized mice and guineapigs (see previous reviews) reports in this paper some experiments with rabbits.

Twenty-four rabbits were infected, 24 hrs. after splenectomy, with *S. usbekistanika* along with 16 normal animals. In the first series consisting of 10 splenectomized animals and 6 controls, the infective dose (1 cc. of infective guineapig's blood) was given subcutaneously. All the animals of this series ran a light course.

In the second series consisting of 14 splenectomized animals and 10 controls, the dose was doubled and was given intravenously with the result that 11 of the splenectomized animals succumbed while all the controls survived. The larger dose and the intravenous method of administration account, in the author's view, for the difference between the results in the two series. He concludes that the R.-E. system is the locus of defence against this type of infection, irrespective of the species of animal tested. The experiments, he considers, refute the criticisms directed against the general thesis of himself and colleagues.

J. C. G. Ledingham.

GRADWOHL (R. B. H.). **The Schilling Blood Methods.**—*Long Island Med. Jl.* 1930. May. Vol. 24. No. 5. pp. 255-264.

The view held by SCHILLING regarding the origin of the circulating blood cells is "trialistic" with myelogenous, lymphatic and reticulo-endothelial stem cells for the granulocytes, lymphocytes and monocytes respectively. With this as a basis and a belief in the important relationship existing between the blood picture and the biological reaction of the body to infection, there is developed the use of the "haemogram" in interpreting the stage of the disease and of its progress towards death or convalescence. A small, but important detail in this doctrine is the technique of preparation of the "margin-free" blood smear. A small coverglass is used to draw the blood along a wide slide so that the smear does not reach to the edges. This gives a more uniform distribution of cells instead of having the larger cells congregated at the edge and the smaller in the centre. Both thin and thick drop methods are made use of, as also are methods of supravital staining with damp chamber to bring out reticulocyte content. An application of the oxydase reaction is utilized for the separation of myelogenous cells from cells of lymphatic origin.

The Schilling index of polymorphonuclear neutrophils differs somewhat from the Arneth index in its subdivision of these cells into myelocytes with simple round nucleus, young metamyelocytes with slightly indented nucleus, "band" or "stab" forms of metamyelocyte with deeply indented nucleus and segmented forms with separated lobulation. These represent stages in the advance of age of the polymorphonuclear leucocyte. In normal blood the differential picture should be basophils 1, eosinophils 2, myelocytes 0, young metamyelocytes 0, stab or band metamyelocytes 4, segmented polymorphs 63, lymphocytes 23, monocytes 6 [adding up to 99, but presumably to 100 with the decimal fraction]. The Schilling haemogram shows the biological reaction to disease, without claiming to be a specific picture for each infection. In the beginning of an infection there is a toxic effect upon the bone marrow with interruption in the development from stab or band forms to the segmented form of neutrophil, resulting in increase in the band forms or a shift to the left. This is the simple degenerative blood picture. With increase in infection the shift continues further to the left and young metamyelocytes appear, indicating an irritation of bone marrow with regeneration. If the infection continue, the left-ward shift continues, while if improvement ensues it recedes again to the right. With the commencement of the polymorph shift to the left there is coincident decline in lymphocytes. With recuperation and a shift of neutrophil characters to the right, the lymphocytes increase. At some stage in the infectious period, when resistance dominates invasion, the monocytes show a sudden rise, and this is termed the "dawn of convalescence."

Another index to the state of infection is afforded by the eosinophil picture. The eosinophils decline and may disappear at the beginning of infections to reappear when the polymorph shift is reversed from left to right. A favourable prognosis is given by a return of eosinophils, a shift to the right of neutrophils, an increase in lymphocytes and a marked increase in monocytes. The haemogram affords evidence as to infection, susceptibility and resistance. It is not always easy to recognize the several leucocyte forms and it is useful to know that the young metamyelocyte forms have a sausage-shaped, kidney-shaped or bean-shaped nucleus, appearing more swollen or thicker than that of the stab or band form and possessing, which the band forms do not, nucleoli at each end. The stab or band forms have various shaped nuclei, which may be of T, V, S. or U types. The exact way in which the kaleidoscopic haemogram is to be interpreted in individual cases of disease requires consultation of the author's work itself.

W. F. Harvey.

THONNARD-NEUMANN (Ernst). **Blood Pressure Studies in the West Indian Negro.**—*Eighteenth Ann. Rep. Med. Dept. United Fruit Company, Boston, Mass.* 1929. pp. 251-264. [15 refs.]. [United Fruit Co. Hosp., Almirante, Panama.]

—, Untersuchungen ueber den erhöhten Blutdruck bei Negeren in Zentralamerika.—*Arch. f. Schiffs- u. Trop.-Hyg.* 1930. Apr. Vol. 34. No. 4. pp. 183-197. [13 refs.] [United Fruit Company Hosp., Almirante, Panama.]

"The arterial blood pressure of 500 West Indian negroes of an average age of 40 years was determined; and 167 or 33.4 per cent. showed a systolic pressure above 140 mm. and an average pulse pressure of 68 mm. No marked differences were found between men and women, regarding the distribution of hypertension cases."

The author writes :—

"It appears to be of practical importance to point out again the frequency of diseases of the circulatory system in a working negro popula-

tion, and to emphasize the fact that hypertension occurring in this race is almost exclusively based on cardiovascular or cardiorenal disturbances."

Reference is made to DONNISON's paper [this *Bulletin*, Vol. 27, p. 162.]

A. G. B.

i. TORGERSON (William R.). **Blood Pressure Findings in Porto Rico.**—*Porto Rico Jl. of Public Health & Trop. Med.* 1930. June. Vol. 5. No. 4. pp. 438-442. [Presbyterian Hosp., Santurce, Porto Rico.]

ii ASHFORD (Bailey K.) & DOWLING (George B.). **A Series of Blood Pressures in 250 Cases in Porto Rico.**—*Ibid.* pp. 477-479. [3 refs.] [School of Trop. Med., Univ. of Porto Rico, San Juan.]

i. The author took the blood pressure of 100 hospital patients eliminating those with heart disease, nephritis, pregnancy and sprue. The average red cell count was 3,500,000. The average systolic pressure was 120.2 mm., diastolic 73.8 and blood pressure 46.4 mm. The difference between the sexes was slight. The averages seem a little below those for the United States.

ii. This series, for the smallness of which the authors apologize, consisted of cases seen in private practice, and does not include cases of sprue or cardio-renal disease. The average systolic pressure was 114.3 in males, 120.1 in females; diastolic 69.1 in males, 76.4 in females.

A. G. B.

RADSMA (W.). Over enkele waarschijnlijke physiologische verschillen tusschen Europeanen in de tropen en in Europa. [**On Some Probable Physiological Differences between Europeans in the Tropics and in Europe.**]—*Genceesk. Tijdschr. v. Nederl.-Indië.* 1930. Aug. 1. Vol. 70. No. 8. pp. 786-803. With 6 charts.

After a period in which the influences of climate on health and disease in the tropics were overestimated, the progress of tropical pathology, on one hand, and of physiological experiments on the other, apparently showing the non-existence of an altered physiological condition in the tropics (EIJKMAN), caused a complete change of views and therewith offered a foundation for more optimism as regards the possibility of acclimatization of the European to life in the tropics.

Though this optimism appears still well justified, yet recent experience throws a new light on the subject of the climato-physiology of the European in the tropics. The author here discusses:—

(1) The body temperature. From the recent literature as well as from his own experiments, he concludes that there is a slight rise of the body temperature of the European in the tropical coastal plain, in comparison with temperate climates. Much confusion in this respect has been caused by not properly taking into account the circumstances under which the temperatures were taken.

(2) The heat production. Basal metabolism estimations in 8 individuals residing 3-4 months in the tropics, yielded results about 10.5 per cent. under BENEDICT's standard values. Here also the circumstances are very important, prolonged rest of the test persons being necessary to obtain trustworthy results.

(3) The alveolar carbon dioxide tension. This shows greater fluctuations, and is on an average lower than the value obtained in Europe, as appears from previous work of the author (see this *Bulletin*, Vol. 26, p. 578).

As the three physiological factors discussed here have to do with the heat regulation in the body, in all probability the differences they show from European values are to be ascribed to climatologic influences.

W. J. Bais.

RADSMA (W.). Het cholesterinegehalte van het bloed bij de bewoners der tropen. [**The Cholesterol Content of the Blood of Inhabitants of the Tropics.**]—*Geneesk. Tijdschr. v. Nederl.-Indië*. 1929. Aug. 1. Vol. 69. No. 8. pp. 793-805. [10 refs.]

BLOOR's method gives 40 per cent. higher figures for the cholesterol content of the serum than that of WINDAUS, but the results run exactly parallel. This is caused by the circumstance that the cholesterol in BLOOR's extract gives a more intensive colour reaction than pure cholesterol. Accordingly BLOOR's reaction is just as useful as WINDAUS' and to be preferred in view of its simplicity. Tested with this method the cholesterol content (in mgm. per cent.) was found: in 16 Europeans average 191 (maximum 209, minimum 130), in 33 native doctors and pupils of the native medical school average 206 (maximum 300, minimum, 143), and in 45 native servants and coolies average 163 (maximum 240, minimum 114).

The corresponding figures for the digitonine method may be found by dividing these figures by 1.4.

It remains to be found out whether to nutrition or other causes (hookworm disease, malarial alterations of the spleen) are to be debited the lower figures in the poorer classes.

W. J. Bais.

WILSON (C. J.). **The Health Boards Enactment of the Federated Malay States.**—*Malayan Med. Jl.* 1930. Mar. Vol. 5. No. 1. pp. 41-42. [1 ref.]

An account is given of this "Enactment" which came into force in January, 1927. There are thereby established, throughout the four States of the Federation, Local Health Boards with wide responsibilities and powers under the general supervision and control of a Central Health Board. The Local Health Boards are established by the Resident of the State who makes application to the Central Health Board on the recommendation of the Health Board of the Medical Department. The appointment of members is made by the Resident in consultation with the Central Health Board. The author writes:—

"Medical and health services in the Federated Malay States have, until now, been shared between the Medical Department of Government and the private enterprise of employers of labour. Under this new scheme a great weight of responsibility is placed on the Local Health Boards. These responsibilities fall under three heads, viz. :—

"(1) Visitation by a medical practitioner to all estates and small holdings, that is to say to all land alienated for agricultural purposes, situated in the Local Board Area, for the purpose of examining the state of health of all labourers employed therein, and providing treatment for the sick and unhealthy.

"(2) The provision of hospitals for the accommodation of the sick among labourers employed on estates, that is to say any agricultural land exceeding 25 acres in extent, within the Local Board Area.

"(3) The formulation and execution of measures for the prevention of disease over the whole of the Local Board Area, including mining lands, villages and State land, excluding only Sanitary Board Areas."

[There is no indication how and whence the necessary funds are provided.]

A. G. B.

REMLINGER (P.). *Les Médersas de Fez au point de vue de l'hygiène.* [**The Hygiene of the Medersas of Fez.**]—*Bull. Acad. Méd.* 1930. July 15. Year 94. 3rd. Ser. Vol. 104. No. 28. pp. 78-89. [3 refs.]

The Medersas are the Mohammedan schools or colleges in which students between 20 and 25 work for seven or eight years. At Fez there are some 500 such students. Here we have an account, the truth, but not the whole truth the author tells us, of the bad conditions of hygiene and nutrition in these colleges.

A. G. B.

CHRISTOPHERSON (J. B.). **The Motive in Women's Dress in the Tropics.**—*Jl. Trop. Med. & Hyg.* 1930. July 15. Vol. 33. No. 14. pp. 201-207. With 10 text figs.

An interesting address with practical advice at the close. Dr. Christopherson suggests that the principle of women's dress in the tropics should be men's dress modified for women with no concessions except to the heat. Women in the tropics engage in the same out-of-door pursuits as men, they encounter the same climatic conditions, and the same biting insects: they need therefore the same protection. The skirt is out of place. Trousers, slacks and plus fours with putties or gaiters should be worn, with tunics or smocks and corresponding under-clothing.

A. G. B.

YEAGER (Clark H.). **Well Pollution and Safe Sites for Bored-Hole Latrines.**—*Malayan Med. Jl.* 1929. Dec. Vol. 4. No. 4. pp. 118-125. With 9 figs.

Bored-hole latrines, actually well shafts 16 inches in diameter running down into the subsoil water, were described in this *Bulletin*, Vol. 26, p. 1045. To determine what risk of widespread contamination of the subsoil water these latrines produce Yeager undertook the following experiments. He sank a series of such 16-inch bore-holes, disposed as in the accompanying plan, within an area protected from casual pollution both by a double wire fence and by being placed under guard. They reached three feet into the subsoil water and were six to nineteen feet deep. Bacteriological examination by Dr. W. A. YOUNG, of King Edward VII College of Medicine, Singapore, showed absence of *Bact. coli* from the water of all bore-holes. Accordingly a Winchester quart of a twenty-four-hour growth of this bacillus was emptied into the central bore-hole and the others were tested at intervals. Bacilli appeared in them as shown in the plan, they travelled seventy feet in

encountered in these experiments. It is also advised, apparently as an alternative, that shallow surface wells should be replaced by deep ones with pumps—a wise ideal.

In comment it may be noted that the former proposal implies that a contagium which travels seventy feet in nineteen days can safely be trusted never to add thirty feet to its journey. Many will disagree with that implication and will prefer to suspend judgment pending the further studies which Yeager recommends, particularly in view of the insistence of local sanitary authority in England that cesspools shall always be water tight, and even then shall be 60 to 80 feet from any well. In this paper Yeager is not directly concerned with hookworm infection, for the prevention of which these latrine wells are advised. As has been noted (this *Bulletin*, Vol. 26, p. 552) their frank purpose is to carry infective material into the ground water supply; and, it may be added, in an unenclosed portion of this deliberately to produce those septic tank conditions which are destructive of hookworm eggs. But of course unless all faecal matter is drowned in this way hookworm infection is not destroyed. Now it is merely necessary to glance at the pan of a water closet after the passage of a mushy stool to see how invariable must be fouling of these latrine wells close to their tops, well within the travelling power of infective hookworm larvae. The man who can avoid this fouling with certainty must be capable of the accurate hitting of an eighteen-inch target, by a faecal missile of varying consistence and often with much scatter, projected more or less downwards often violently from a crooked gun barrel (in spite of its being labelled "rectum"), and with aim greatly handicapped by the disconcerting attitude of defaecation. In these conditions even a gun layer in the King's Navy would make poor shooting. And the penalty of each failure by a hookworm infested person to produce deliberate and direct pollution of the subsoil water is almost certainly dejectional hookworm infection for someone. Yeager's work, here considered, implies that whether there is hit or miss the shooting promises to be equally disastrous to public health.

Clayton Lane.

BABLET (J.). A propos de la réglementation des fosses septiques en Indochine. [**Septic Tanks in Indo-China.**]—*Bull. Soc. Méd. -Chirurg. Indochine*. 1929. Oct. Vol. 7. No. 10. pp. 533-538. [Pasteur Inst., Hanoi.]

This is a brief account of the difficulties of good sewage disposal in the towns of Indo-China, especially Hanoi.

Septic tanks plus bacterial beds seem to have achieved some success in European quarters. For the tank itself a minimum capacity of 250 litres per person is demanded if W.C. wastes alone are received; 500 litres if household sullage is included.

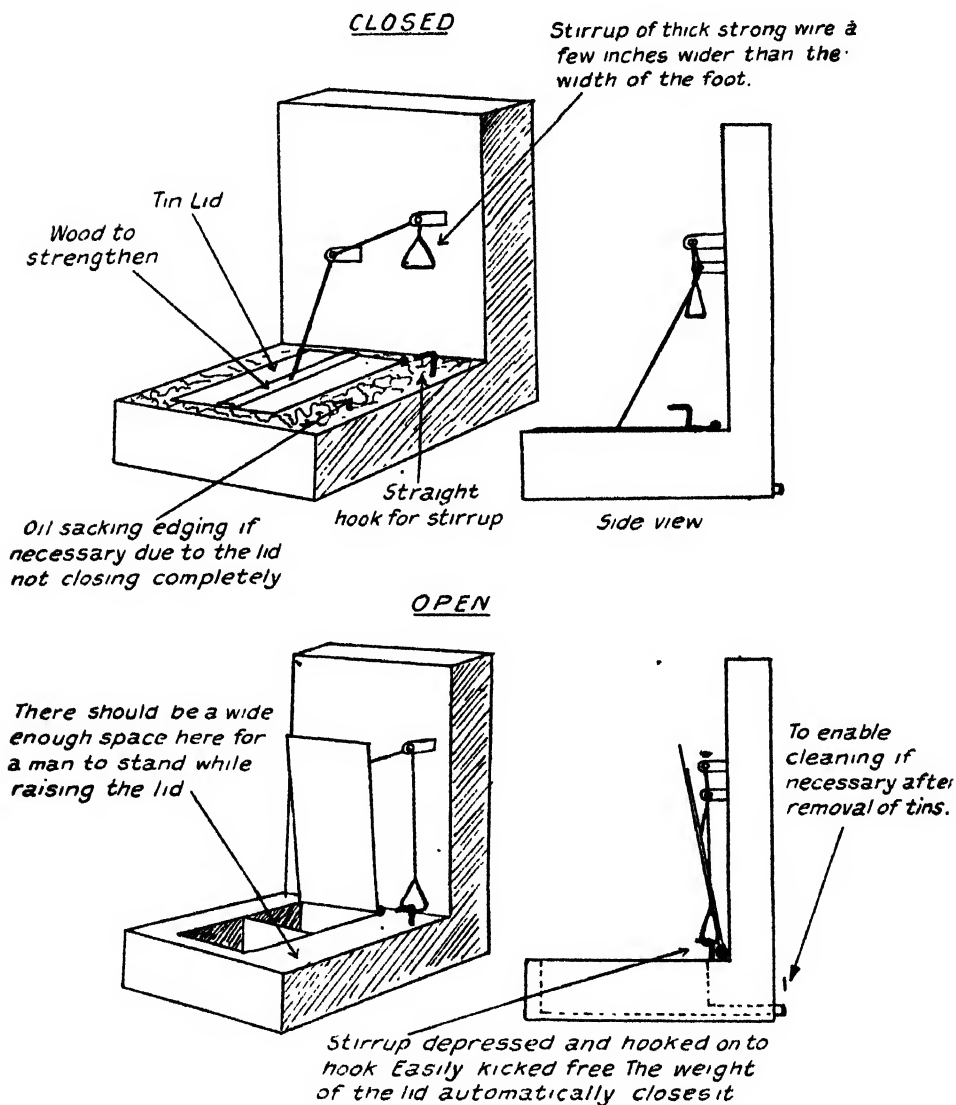
For the bacterial bed a square metre of surface at one metre depth of the usual materials is demanded. The tank is regarded simply as a liquifying contrivance without destructive action on pathogenic bacteria, although the dimensions (250 litres) suggested provide almost 5 days retention in the tank. The effective bactericidal part of the apparatus is thought to be the filter bed.

J. F. C. Haslam.

BROWN (H. Horan). A Method of Fly-Proofing in Indian Latrines.—
Jl. Roy. Army Med. Corps. 1930. Mar. Vol. 54. No. 3.
 pp. 207-208. With 1 diagram.

The following is the complete text of Brown's note. To the abstracter the gadget seems rather "Heath Robinsonian"—

"A great difficulty in the fly-proofing of latrine pans in India is the caste prejudice against touching any part of the latrine.



Illustrating Major H. Horan Brown's device for a fly-proof lid for Indian latrines.

[Reproduced from the *Journal of the Royal Army Medical Corps.*]

"The method suggested in the following diagram overcomes this difficulty in that only the foot is used.

"The user puts his foot in the stirrup, depresses the stirrup and pushes it on to the peg.

"After use, he kicks the stirrup free and the lid falls.

"The only cost should be occasional renewing of the wire rope between the lid and the stirrup.

"The floor should be sloped slightly downwards and backwards for the tin receptacles to facilitate cleaning.

"*Advantages* :—(a) Caste prejudice to touching the lid is overcome ; (b) fly proof ; (c) cheap ; (d) easily attached to any present latrine."

J. F. C. Haslam.

BLAKEMORE (W. L.). **Bucket Latrines on Hardouin Estate, Province Wellesley South.**—*Malayan Med. Jl.* 1929. Dec. Vol. 4. No. 4. p. 151. With 2 figs.

The latrines are built in blocks of two with separate compartments. Behind is a small concrete water tank for the coolies' use after defaecation, surrounded by a broad cement apron sloping to cement drains round its periphery. The exit drains are led to a small concrete sump, the outlet of which drains to the main estate drain. The sump pit is emptied daily and its contents buried. The concrete apron is washed down daily when the buckets are emptied.

A. G. B.

VAN HEURN (W. C.). Over de verhouding tusschen huisrat en rioolrat te Batavia en over de bestrijdingsmogelijkheid van deze laatste. [**Relation between House Rat and Sewer Rat at Batavia : Possibility of combating the Latter.**].—*Geneesk. Tijdschr. v. Nederl.-Indië*. 1930. June 1. Vol. 70. No. 6. pp. 588-594. With 1 text fig.

The author describes the results of systematic catches in and round a European bungalow at Batavia, showing clearly the predominance of *R. norvegicus* over *R. rattus*. He maintains that systematic trapping, as far as regards the house rat by means of SCHUYLER'S all-steel horse shoe trap No. 1, but for the brown rat by means of the pole trap, may considerably reduce their number. The latter traps are by preference to be put up in the sedimentation pits of the house drains as represented in a sketch.

W. J. Bais.

BROWN (James Y.). **A Review of Mosquito Control in Lagos.**—*West African Med. Jl.* Lagos. 1929. Apr. Vol. 2. No. 4. pp. 179-182. With 1 plan.

No part of Lagos island is more than 21 ft. above sea-level, and a considerable area is less than 3 ft. above that datum. The average rainfall in the last decade is 67·872 in. and the maximum tidal range is 3 ft. Trees and other plants are important factors in the breeding of mosquitos ; the principal trees responsible being the "Awin," the Mango, the Bread-fruit and the Cashew. The palm, with the exception of the Traveller's palm, in which the larvae have been found on rare occasions, and the banana plant are of no importance in mosquito breedings at Lagos. The swamps, which with few exceptions are partly tidal at high tide, are near all foreshores round the island. It is amongst the vegetation within 20 yds. of the swamp margin that

the mosquitoes breed, except where the swamp contains separate woodland pools. *Anopheles gambiae* and *Culex thalassius* have been found rarely in waters of fairly high salinity. The street drainage has improved considerably in the past two years, but there are still 50 streets in the native quarter that are recorded as anopheline and culicine breeding places requiring weekly oiling. The methods of mosquito eradication or control in operation are: Drainage of swamps, ditching and control by fish, use of larvicides (fuel oil or Paris Green), making swamps tidal (increase of salinity), reclamation and filling, and general sanitary inspection (eaves, gutters, tanks, crab-holes, etc.). The author stresses the importance of contour drainage which lowers the ground water and intercepts seepage into the swamps. Lateral drainage was used in several low-lying areas which were not heavily vegetated, and where the drains could be easily controlled. "Opepe" trees were planted at intervals throughout reclaimed swamp areas to lower the ground water by leaf transpiration. The figures for the house larvæ index show progressive improvement since 1925 and the rate of infantile mortality a steady decrease.

H. Home.

LEPRINCE (J. A.) & JOHNSON (H. A.). **Development of a Power Dusting Device for applying Paris Green as an Anopheline Larvicide.**—*Public Health Rep.* 1929. Apr. 26. Vol. 44. No. 17. pp. 1001-1017. With 13 figs. (12 on 6 plates) & 9 diagrams. [1 ref.]

During 1922-1927 successful experiments with Paris green distributed from airplanes were carried out, especially in the dense growths of Quantico Bay, Va., and Chopawamsic Swamp, at a wind velocity not over 20 miles per hour and provided that the plane was 100 ft. or less above the water. The mechanical dusting device now reported is to make possible the control of breeding places of *Anopheles* larvæ of approximately 1 to 100 acres, the specification requiring that it shall be mobile, inexpensive and, if possible, operated by one man. The plant used was made up of portable units of light weight mounted in a light skiff-type of boat, driven by an out-board motor; the petrol-driven generator was of 110 volts, weight 108 pounds, the centrifugal fan blower, weight 8 pounds, 110 volts, with inlet flange and 1½ in. suction nose, with a hopper for dust delivery. The whole plant is easily moved from boat to boat. The blower is connected with the generator by a flexible wire cable such as is used with a vacuum cleaner. It is held in the hand or can be fastened to the boat's side and operated from any position and at any angle required. The blower has a theoretical velocity of about 15,000 ft. per minute and moves 45 c. ft. of dust-laden air per minute. Cost of plant \$497.50. The plant was tried out in a lake containing thousands of submerged and decaying stumps, with large areas of shallow and densely overgrown water, and many types of moss, duckweed, lilies, etc., and offered the most difficult conditions in which to operate. Full details of the experimental work are given and the methods of control. The conclusions arrived at are that the plant gave excellent results, the material costs being as low as 15 cents per acre for dusting. Hydrated lime is the most satisfactory diluent tested for use with Paris green, and 15 per cent. Paris green mixture gives most uniform results. The wind velocity should not be over 7 or 8 miles per hour and in moderate breezes a 15 per cent. mixture gives a lethal path at least 525 ft. wide. In

ordering Paris green as an anopheline larvicide the authors advise that a sample should be secured before purchase, tested with larvae, and its toxicity demonstrated, because Paris green varies greatly in its larvicidal power, and in the experiments two of the three samples used were unsatisfactory.

H. Home.

YACOB (M.) & SHAH (K. S.). A Preliminary Report on the Suitability of Paris Green as an Anopheline Larvicide as applied to Punjab Conditions.—*Indian Med. Gaz.* 1930. Feb. Vol. 65. No. 2. pp. 84–88. [11 refs.] [Punjab Epidemiol. Bureau, Lahore.]

The sample of Paris green used in these experiments came from Messrs. Siegle & Co., Stuttgart, and was found to contain 57.7 per cent. arsenious anhydride. Field experiments carried out on a storm water channel showed that a treated area remained free of larvae till the third day after greening, that 1 gm. of green in 99 gm. of road dust destroys all anopheline larvae in 10 sq. yards of water surface in 24 hours, and that in greater dilution the green is ineffective. Eggs and pupae are not harmed and the film on the surface does not prevent the mosquito from laying. Since in the Punjab the minimum period of larval development in the autumn is 7–8 days, the intervals between greening should not exceed 6 days. One application to an area of 1,000 sq. yards cost 33 annas, exclusive of the operating charges.

Investigation showed that no larvae could be found at a greater distance than 5 feet from the bank of the stream; the green was therefore used up to six feet only from the bank and time and money were saved. The green was spread partly by hand-blower and partly by knapsack-blower.

A. G. B.

LOPEZ (Jose Alberto). Arsenical Dermatitis—with Case Report.—*Eighteenth Ann. Rep. Med. Dept. United Fruit Company, Boston, Mass.* 1929. pp. 189–191. [Truxillo Railroad Co. Hosp., Puerto Castilla, Honduras.]

Paris green mixed with road dust or other excipient has been used for several years on the United Fruit Company's plantations, usually in 1 : 100 strength. The mixing is done in a house or shed protected from wind; the worker therefore must get a thin coating of fine dust on exposed skin and must inhale impalpable particles. Hundreds of pounds of Paris green have been used in the different divisions, but there is no record of toxic symptoms until the present case.

A Honduran, *æt.* 25, admitted with intense itching of face, neck, hands and forearms, swelling of face and eyelids, and inflamed eyes. Skin was red and indurated with small papules and pustules on all exposed parts. Had joined sanitary squad 3 months before, and was employed in mixing and broadcasting Paris green. Complained only of want of sleep. With mag. sulph. internally and applications of calamine he was nearly well in 3 days. He left on the 4th, against advice rejoined the sanitary squad, and 4 days later returned as bad as ever. Recovery ensued with the same medication, the man became a night workman and had no further trouble.

The author suggests that the condition may develop subsequent to sensitization of the constantly irritated tissues—in other words is a local cutaneous anaphylaxis.

A. G. B.

DI MATTEI (Giuseppe). Sopra una dermatosi provocata dall'uso del "verde di Parigi" nel personale addetto alla disanofelizzazione idrica. (**On a Dermatitis caused in Larval Control Agents by using Paris Green.**)—*Riv. di Malariaologia*. 1929. Nov.-Dec. Vol. 8. No. 6. pp. 669-673. [6 refs.] [English summary (5 lines) p. 747.] [Inst. of Hyg. & Bact., Univ., Catania.]

Those engaged in mixing and distributing Paris green are liable, not only to general disturbances such as headache, vertigo, nausea, but to eruptions due to local action of the compound. These vary from mere erythema and brownish pigmentation to vesicles, pustules and multiple small ulcers. The parts affected are the hands, especially the interdigital folds, and parts where sweat glands are numerous, the neck, legs, genitalia and inguinal regions. Hence, manual mixing is better replaced by some form of mechanical mixer; during distribution the operator should wear a mask, he should thoroughly wash and, preferably, bathe after his work before taking food.

H. Harold Scott.

FEEGRADE (E. S.). **Experiments with Isotex as a Larvicide.**—*Indian Med. Gaz.* 1929. May. Vol. 64. No. 5. p. 252.

Isotex, a proprietary preparation of the Chemical Company of New York, is a dark brown fluid forming a film on the surface of water. Experiments were made both in the laboratory and field on anophelines and culicines. The conclusion reached was that isotex is a powerful larvicide but, being fatal to fish, is unsuitable for use in antimalarial measures.

A. G. B.

FEEGRADE (E. S.). **Results of Experiments with Crude Oil Products of the Burma Oil Co., Ltd., Rangoon, as Larvicide.**—*Indian Med. Gaz.* 1929. May. Vol. 64. No. 5. p. 255.

Three proprietary preparations of the Burma Oil Co. were subjected to laboratory experiment to ascertain their properties as larvicides and their relative efficiency. *Aedes argenteus* larvae alone were obtainable in any quantity; large larvae of equal size were chosen. It was early noted that other things being equal the results varied from day to day, and it was found that a room temperature of 90° and over hastened evaporation and decreased anti-larval action. The few experiments are shortly described. Of the three products "Bauxite extract" was most efficient, then "Distillate fuel," and lastly "Victoria kerosene." [No details of relative cost.]

A. G. B.

STRICKLAND (C.). **Soap as a Mosquito Larvicide.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1929. Apr. 25. Vol. 22. No. 6. pp. 509-510. [1 ref.]

Experiments both in laboratory and field were made in India, with marine soap obtained from Messrs. Edw. Cook & Co. and a French firm. For the details the paper must be consulted. It was found to be less effective in the field than in the laboratory, and from 4 to 48 times dearer than kerosene, the cost varying with the relation of surface area to volume of water. In a small pool at Sonarpur a dilution of 3 ounces of soap in 6 gallons of water proved ineffective.

A. G. B.

REVIEWS AND NOTICES.

EYRE (J. W. H.) [M.D., M.S., F.R.S. (Edin.), Professor of Bacteriology in the University of London: Director of the Bacteriological Department of Guy's Hospital, etc.]. **Bacteriological Technique. A Laboratory Guide for Medical, Dental and Technical Students.** Third Edition. pp. xii+619. With 238 text figs. & 3 coloured figs. on 1 plate. 1930. London: Baillière, Tindall & Cox, 7 & 8, Henrietta Street, Covent Garden, W.C. 2. [21s.] [Review appears also in *Bulletin of Hygiene*.]

For nearly three decades Eyre's *Bacteriological Technique* has filled a useful place among laboratory guides and the appearance of a new edition cannot fail to be noted with pleasure by those who have made use of the book in its previous forms. The special feature of the work is the clear and detailed way in which the technical methods which underlie all bacteriological work are described and illustrated. It does not attempt to be comprehensive; for the most part only the most important methods are described, but in such a manner that even an isolated worker with no special knowledge of bacteriology could carry out the operations without further help. In this respect the new edition is not behind its predecessors, but one feels that it would have been made more useful had the revision been more drastic. As in former editions, such fundamental matters as sterilization, the making of media, the structure and working of the microscope and other laboratory apparatus are described with exemplary clearness. The chapters on media making have been brought up to date by the addition of a short but adequate account of pH. On the other hand, one can detect remains of previous strata which might well have been removed. Thus, in the chapter on Anaerobic Cultivation several of the methods described have passed out of routine use and the simple methods employed for cultivating anaerobes without special apparatus could have been given more attention. McIntosh and Fildes' jar, now probably the most useful apparatus for obtaining anaerobiosis, is described, but the statement that by its aid the isolation and cultivation of anaerobes is as readily carried out as that of aerobes would hardly be confirmed by any worker with special knowledge of this difficult group.

Considering that several chapters are devoted to animal experiments it seems an error of arrangement that such an important routine as the testing of the diphtheria bacillus for virulence should be disposed of under the heading of Milk and that no reference should be made to the now popular intradermic method of virulence testing. In spite of a somewhat disappointing revision the book remains one of the best and clearest descriptions of elementary bacteriological technique available and the best compliment that can be paid to it is to say that it has always appeared a favourite work with beginners, isolated workers, laboratory assistants and others who require clear working instructions in the technical routine of a bacteriological laboratory.

C. C. Okell.

SPAIN. Ministerio de la Gobernación, Dirección general de Sanidad. Comisión central de trabajos antipalúdicos. **Memoria de la campaña contra el paludismo (1928-1929).** [Antimalaria Campaign 1928-29.]—419 pp. Ill. 1930. Madrid.

Although this memoir deals mainly with the years 1928-1929 anti-malarial work in Spain was started in 1920 and carried on in small way in the following years. In 1924 the Commission drew up certain anti-paludic regulations which were sent to the King. A grant was made for work in

the provinces and in 1927 this grant was more than doubled, with help from the Rockefeller fund. The organization of the Commission and the regulations are described in the Introduction. There follows a chapter describing briefly the methods employed, the distribution of arthropods, etc., with lists of papers on the various subjects published during the last eight years. At the end of the volume there is a chapter on the geographical distribution in Spain of the Culicidae including *Anopheles*, *Culex* and *Aedes*. The most common carriers of malaria are : *Anopheles maculipennis* and *A. bifurcatus* ; *A. hyrcanus* is found along the Mediterranean coast. The provinces are taken separately and a section is devoted to the work now being done. The information is mainly in the form of statistical tables and charts. Looking through the monthly tables of morbidity one notices that, generally speaking, the worst months are June to October, with September the worst of all. Of course, the data vary for different regions. In the province of Salamanca the disease is not very prevalent and it is stated that there have been no deaths from malaria in the Matilla service area during 1928-1929. On the other hand, in the Delta of the Ebro the disease is more common and a table shows 66 deaths in 1928 and 61 deaths in 1929. In the deltas it is difficult to apply anti-larval methods ; but it is recorded that a great number of gambusias and other Cyprinodonts exist in the waters of the Ebro delta. The methods in an anti-malaria campaign in Spain are the same as those generally employed in any malarious region ; but the eradication of malaria is difficult and expensive and the Spanish Sanitary authorities may be congratulated on the work they are carrying out. The frontispiece is an excellent portrait of LAVERAN.

J. H. Tull Walsh.

TROPICAL DISEASES BULLETIN.

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[No. 2.]

UNDULANT FEVER.

WILSON (G. S.). **The Diagnosis of Undulant Fever.**—*Brit. Med. J.* 1930 Oct. 25. pp. 679-681. [14 refs.] [Summary appears also in *Bulletin of Hygiene.*]

The author discusses the various methods that are available for the diagnosis of *Br. abortus* infections in man, and the significance which should be attached to the results obtained. As regards the agglutination test, he considers that the occurrence of non-specific agglutination has been considerably overestimated. He concludes that agglutination to a titre of 1:10-1:80, in the absence of clinical symptoms, is probably indicative of past infection with an organism of the *Brucella* group; that a titre of 1:100 or over, in the absence of clinical symptoms, probably indicates a latent infection or repeated past infections; that a titre of 1:100 or over, in the presence of pyrexia and other symptoms of disease, may be considered as practically diagnostic of active infection with an organism of the *Brucella* group; and that a titre of 1:20-1:100, in the presence of the clinical signs of undulant fever, may likewise be considered as practically diagnostic of active infection.

He emphasizes the importance of making every effort to confirm the diagnosis by the isolation of the organism from the patient's blood, but notes that this method is by no means always successful.

Finally he considers briefly the possible usefulness of cultures taken from the urine or faeces, of animal inoculation, and of the diagnostic intradermal reaction.

W. W. C. Topley.

RODENWALDT (E. R. K.) & COHEN (A. J.). *Febris undulans* (Malta-koorts) in Ned.-Indië. [**Undulant Fever in Dutch East Indies.**]—*Geneesk. Tijdschr. v. Nederl.-Indië*. 1930. July 1. Vol. 70. No. 7. pp. 629-651. With 5 charts on 2 folding plates. [14 refs.]

After a full description of the disease (new in Dutch East Indies) containing no novel features, four cases of *febris undulans* are quoted which occurred round Malang (East Java). In a footnote two more cases from the same district are mentioned and one from Semarang. The cases presented nothing unusual. The diagnosis was made by agglutination against *Br. abortus*, or against *Br. melitensis*. The lowest titre regarded as significant for diagnosis was 1:200.

Epidemiological research yielded no clear results. The diagnosis is generally made in the later stages of the disease so that the source

is difficult to trace. The fact that infectious abortion of cattle has been noticed occasionally in the D.A.E.I. whilst no infection with *Br. melitensis* is known to the veterinary surgeons, together with the rarity of the disease in man (though goat's milk is often taken by the population) renders it most probable that Bang's bacillus is the causative agent.

W. J. Bais.

LÖFFLER (W.) & v. ALBERTINI (A.). Pathologisch-anatomische Befunde bei sog. Febris undulans des Menschen. [**Pathological Findings in a Case of Suspected Undulant Fever.**—*Krankheitsforschung*. Leipzig. 1930. Jan. Vol. 8. No. 1. pp. 1-16. With 8 figs. (7 coloured) on 4 plates. [7 refs.] [Med. Polyclinic, & Path. Anat. Inst., Zurich.]

The report of a case of intermittent and remittent fever in a farmer aged 32. The principal feature, apart from fever, was the presence of a markedly enlarged spleen. Various diagnoses were suggested, such as tuberculosis, leukaemia, Banti's disease, splenic anaemia. Finally, in view of the progressive weakness, anaemia and continued fever, the spleen was removed. At the operation a small portion of the liver was obtained for examination. A very careful examination (histological) of sections of the spleen and liver was made, but no definite diagnosis was arrived at. The patient made an excellent recovery, the fever ceased, and he was able to return to his work in a few weeks.

In view of a possible diagnosis of leukaemia, periodical blood counts were carried out for a period of two years—up to 1929. During this time a series of cases of undulant fever was met with by the authors, and in view of the clinical similarity to these cases the blood of this patient was tested a year and four months after the operation and was found to agglutinate *Br. abortus* in a dilution of 1/30, the complement fixation test also being positive. A retrospective diagnosis of undulant fever was therefore made and the present paper published.

The principal changes noted are well illustrated by excellent coloured plates. The picture demonstrated by histological examination in this case is compared with that found in Banti's disease, which it closely resembled.

In view of the rarity of such an opportunity as occurred in this case for examination of the spleen—removed actually during the course of the fever—this paper is well worthy of study.

D. Harvey.

BEVAN (Lt. E. W.). Notes on a Case of Rhodesian Undulant Fever.—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1930. June 30. Vol. 24. No. 1. pp. 93-95.

An account of a very prolonged case of Rhodesian undulant fever (*abortus*). The interesting feature was the presence of blood in involuntary seminal emissions, which continued for nine months, and pointed to an infection of the vesiculae seminales. A similar condition in bulls infected with *Br. abortus* has been described.

D. H.

BROC & BONAN (H.). Fièvre de Malte à forme délirante. [**Undulant Fever with Delirium.**—*Tunisie Méd.* 1930. Feb. Vol. 24. No. 2. pp. 43-45.

A woman of 21 years fell sick with slight fever, sore throat and enlarged tonsils. On the fourth day she had a rigor, followed by a sharp rise of temperature, with severe headache and pains in the limbs. A septicæmic condition was diagnosed, but blood culture was negative. On the eighth day the temperature fell to normal, but the patient's condition was grave,

with rapid pulse and extreme prostration. The following day she became delirious, remained so for about eight days without cessation day or night and refused all nourishment. She eventually made a good recovery, but had a relapse of fever one month later.

The diagnosis was confirmed by a positive agglutination test in a dilution of 1/200 on two occasions; the intradermal reaction of Burnet was also positive

D. H.

PAVIOT (J.), MARTIN (Joseph F.) & DECHAUME (J.). Cellulite et myosite dans la fièvre de Malte. Etude anatomo-clinique. [**Case of Cellulitis and Myositis in Undulant Fever.**]—*Jl. Méd. de Lyon*. 1930. Feb. 5. No. 242. pp. 87-93. With 5 figs. [4 refs.]

The authors describe a case of undulant fever in a man aged 42. The patient had severe pains in the legs and muscles elsewhere. Following on complaint of pain in the lower abdomen a tense, painful and tender swelling was discovered just above the pubes and apparently in the sheath of the rectus muscle. Incision gave exit to some oedematous fluid; there was no pus. With a view to determine the nature of the swelling and to obtain an explanation of the pain in this region and elsewhere a piece of tissue was excised, and sections were stained and examined. Four figures are given showing the condition present, which was due not to any cellular or inflammatory invasion but to effusion of plasma between the cells and separating the muscle bundles, involving nerves and causing the pain. In some of the sections formation of young fibrous tissue can be seen and also some new elastic tissue. The condition apparently clears up or may leave small fibrous nodules in the subcutaneous tissue. The authors consider that this effusion of plasma accounts for the pains in the muscles frequently complained of in this disease and especially in the muscle sheaths close to the joints. There is no question of an inflammatory condition.

D. H.

MALAGUTI (Antonio). Nuovi focolai de febbre ondulante in Romagna. [**Fresh Foci of Undulant Fever in Romagna.**]—*Giorn. di Clin. Med.* 1930. Apr. 10. Vol. 11. No. 5. pp. 311-330. [18 refs.]

Three typical cases of undulant fever of average severity are described. The diagnosis was made by agglutination, the serum giving a positive with both *Br. melitensis* and *Br. abortus* in equal titre in the first two, higher with *Br. abortus* in the third. They came from two districts in Forli Province where cases had not previously been recorded.

H. H. S.

DUBOIS (Charles) & SOLLIER (Noel). La vaccination préventive de l'homme contre le "Melitensis" paraît être une nécessité dans les milieux infectés de mélitococcie animale. [**Need for Protective Inoculation of Man against Undulant Fever in Foci of Animal Infection.**]—*Bull. Acad. Méd.* 1930. Apr. 1. 3rd Ser. Vol. 103. No. 13. pp. 319-328. [6 refs.]

The problem of undulant fever is a grave one in the south of France. Several thousand cases occur every year. The disease is also common in domestic animals, especially in sheep and goats. The suggestion has been made to attack the disease by the vaccination of these animals, but unfortunately an efficient vaccine is still to seek. As regards the people engaged in farming and dealing directly with these infected animals, hygienic measures alone have failed to protect. It is suggested, therefore, that they be protected by

vaccination. That such protection is possible has already been shown by NICOLLE, CONSEIL and BURNET, who used a heat-killed vaccine of *melitensis*, given in two doses of 700 million bacteria at 7-day intervals. Laboratory workers have been protected in the same way. For those who do not come directly into contact with animals, boiling of milk may be sufficient.

The authors give an interesting account of an outbreak of undulant fever on a sheep farm; no cases of abortion had occurred among the flock, but a new shepherd arrived who was recently convalescent from undulant fever; a few months later 40 cases of abortion occurred among the flock and four cases of undulant fever among the workers on the farm. The remaining 18 people were inoculated in two doses with a heat-killed vaccine containing 2,000 million bacteria in 1 cc., the first dose being $\frac{1}{2}$ or $\frac{1}{4}$ and the second 1 cc.

The authors strongly urge the necessity of preventive inoculation of all the people "dans les foyers de melitococcie animal."

D. H.

ZAMMIT (Themistokles) & DEBONO (J. E.). **Immunisation of the Maltese Goat by Means of Cutaneous Vaccination.**—*Lancet*. 1930. June 21. pp. 1343-1344. [Public Health Dept., Valetta.]

Following on the lines suggested by BESREDKA's work the authors employed dermal immunization against *melitensis* infection in goats. A filtrate of a broth culture of *melitensis* was sprayed over the mammary region and into the mouth, and 1 cc. was injected intradermally in four places. The treatment was repeated four times on alternate days. No agglutinins appeared in the blood. Two days after the last dose all the treated goats and a control were inoculated subcutaneously with 1 cc. of a living broth culture containing 3,000 million organisms. Fever appeared in the control on the fourth day and agglutinins were demonstrated in the blood of all the animals. On the eighth day numerous organisms (*melitensis*) were demonstrated in the milk of the control goat, but none were found in the milk of any of the inoculated goats. All goats were killed six weeks later. In two of the inoculated animals all cultures were sterile; three showed a light infection in glands and kidney. The control goat was heavily infected, infection including the mammary gland, which was spared in inoculated animals.

A second series was employed, using a similar technique, but with a formolized broth culture. The results were similar. In four out of twelve inoculated animals there was no trace of infection, and in none was the mammary gland infected.

The authors consider these results very hopeful and are continuing their investigations with a view to the inoculation of the local Maltese goats.

D. H.

CERRUTI (Carlo). Sulla vaccinazione delle capre contro l'infezione da *Br. melitensis* con vaccini formolati. (Nota preventiva.) [**Prophylaxis of Brucella melitensis Infection in Goats by means of Formolized Vaccine.**]—*Arch. Ital. Sci. Med. Colon.* 1930. May 1. Vol. 11. No. 5. pp. 257-262. English summary (7 lines). [16 refs.]

The work described was carried out in Cagliari (Sardinia) where a large proportion of goats and sheep is infected. The animals appear

fat and well and produce plenty of milk. Abortion, however, is very common, up to 90 per cent. and even higher, and the young die from the infection in large numbers 1-2 months after birth. The author used for vaccine a 7-day broth culture, to which was then added 0.3 per cent. formol. The mixture, after being left at 37° C. for 5 days with frequent shaking, was placed in vials ready for use. Three doses each of 5 cc. were injected at 10-12 days intervals. For the first a human strain was used, for the others a strain isolated from an infected animal.

Prior to starting the vaccination the rate of abortion was 32 per cent. (80 out of 250); 230 were given the full course and only 3 aborted (1.3 per cent.); 20 received one dose only, and 8 of these aborted. None of the young died from infection. If, as the result, the goats cease to excrete the organisms a marked reduction in human cases will follow.

H. H. S.

MARSHALL (M. S.) & JARED (Dorothy). **Bacteriostatic Action of Dyes on the Organisms of Undulant Fever.**—*Proc. Soc. Experim. Biol. & Med.* 1930. Mar. Vol. 27. No. 6. pp. 525-527. [1 ref.] [Med. School, Univ. of California, San Francisco.]

It has been stated that the inhibitory action of certain dyes can be relied on as one means of differentiating between the caprine, bovine and porcine strains of *Brucella*. But even those who claim most for this method allow that there are discrepancies. The authors carried out some tests to explain, if possible, these discrepancies. The method was to incorporate varying dilutions of dyes in melted liver hormone agar, and to plant out the strains under test on plates formed from this medium. The inoculum was as nearly as possible the same in amount in each case, an important point, for it was found that by varying the amount of inoculum discrepancies resulted. It was noted also that on occasion a strain might grow in agar with gentian violet in a dilution of 1 : 50,000, but was inhibited on a plate with one-fifth less of the dye. Other dyes gave the same irregular results. Four samples of thionin obtained from different sources gave entirely different results with the same strain of *Brucella*. It was also noted that the rough variant of a strain was definitely more resistant to the action of dyes than the smooth variant.

It is obvious that the action of dyes cannot be relied upon as a means of differentiating various strains, although in some instances confirmatory evidence may be obtained.

D. H.

AMOSS (Harold L.) & POSTON (Mary A.). **Cultivation of *Brucella* from the Stools and Bile : Further Observations.**—*Jl. Amer. Med. Assoc.* 1930. Aug. 16. Vol. 95. No. 7. pp. 482-483. [4 refs.] [Med. Clinic, Johns Hopkins Univ. & Hosp., Baltimore.] [Summary appears also in *Bulletin of Hygiene*.]

Organisms of the *Brucella* group were isolated from stools by the following technique. The stool suspension is treated with immune serum to clump any organisms present, and the sediment produced by differential centrifugation is seeded on to Teague medium. (Meat extract agar 100 cc. at pH 7.4 to which is added, while melted, 5 cc. each of a 20 per cent. solution of sucrose and lactose, 1 cc. of a 4 per cent.

aqueous solution of yellow eosin and 1 cc. of a 1 per cent. aqueous solution of methylene blue.) Two plates are incubated in air and 2 in 10 per cent. CO₂.

Organisms of the *Brucella* group were obtained 78 times from the stools of six patients, whereas another patient, with positive blood culture and a mild type of infection, gave stools which yielded no *Brucella* in 12 examinations. In one of the six, *Brucella* was isolated from the fluid obtained by duodenal drainage before operation and from the gall bladder contents at operation.

As far as the authors' experience goes, the substitution of Huddleson's liver agar, pH 6.6, as a basis, for their meat extract [it is not stated whether the sugars and dyes were the same in both media] in no way improves the rate of growth of the organism, and gave exactly similar results in a series of 10 stools tested in parallel series with meat extract agar.

A. A. Miles.

NEIVA (Cicero). Agglutininas para *Brucella abortus* em sêros humanos. [Agglutination of *Brucella abortus* by Human Sera.]-*Rev. Soc. Paulista Med. Vet.* São Paulo. 1930. Mar.-Apr. Vol. 1. No. 3. pp. 73-80. [50 refs.] English summary. [Butantan Inst., Butantan.]

In 1928 the author tested the sera from 176 cattle in S. Paulo and found that 18 agglutinated *Br. abortus*. He then examined 221 specimens from human subjects sent to the Bacteriological Institute, Butantan, for the Wassermann and other serum tests, to determine the agglutination reaction, using two strains of the organism of bovine origin, one from the laboratory at Buenos Aires, the other from Alfort, France. One of the sera gave a positive when diluted 1 in 160 and two at 1 in 320. Several agglutinated at titres below this, but were not regarded as positive. All these were from Japanese recently arrived in the country. Blood cultures were attempted from 39 individuals but all were negative. To avoid conveyance of the disease by milk, all the milk is now pasteurized before distribution.

H. H. S.

DENGUE AND PAPPATACI FEVER.

BLANC (Georges) & CAMINOPETROS (J.). Recherches expérimentales sur la dengue. [Experimental Researches on Dengue.]—*Ann. Inst. Pasteur*. 1930. Apr. Vol. 44. No. 4. pp. 367–436. With 12 text figs. [3 pages of refs.] [Hellenic Pasteur Inst., Athens.] Also in *Arch. Inst. Pasteur Hellénique*. 1930. Vol. 2. No. 2. pp. 199–276. With 12 text figs. [3 pages of refs.]

This long article gives an account of the experimental work carried out at the Pasteur Institute in Athens during the epidemic of dengue in that city during 1927–1928.

The new facts arising out of this work are given as follows :—

1. The serum of a dengue patient kept in the dark in sealed tubes at room temperature will retain its virulence for at least fifty-four days.

2. Man may suffer from an attack of inapparent dengue. During such an attack the blood is virulent and immunity follows.

3. The guineapig if inoculated with virulent dengue blood is not affected, but five days later its blood can be shown to be virulent.

The results of this work have already been published in various articles, but in the paper under review are brought together in more detail. Reference is made to the history of dengue research. It is pointed out that on the work of GRAHAM it has been claimed that *Culex pipiens* may act as a carrier of the disease. What GRAHAM actually did in 1907 at Beirut was to collect a mixed bag of mosquitoes in the room of a person suffering from dengue, and convey these to a village many miles away where he persuaded two volunteers to release the mosquitoes inside their mosquito nets. Both the men contracted dengue a few days later. No one else in the village contracted dengue. GRAHAM did not state that the mosquitoes he used were *pipiens*, but that both *Culex pipiens* and *Stegomyia* were present in the room.

American workers, in 1924, showed that *Culex fatigans* is not capable of conveying the disease which is readily transmitted by *Aedes aegypti* (*Stegomyia*). The authors worked with this species in Greece, and a very elaborate account of the methods they adopted in keeping and breeding the insect is given ; this chapter is fully illustrated.

Mosquitoes captured in Athens and kept in captivity in the laboratory remained alive from October 9th to May 25th, or 228 days. (Some mosquitoes bred in the laboratory lived for 186 days.) The mosquitoes were fed regularly on human blood and laid numerous eggs.

Transmission experiments are described and full protocols given. In one interesting experiment two batches of mosquitoes were employed, one of *Stegomyia* and one of *Culex pipiens*. These mosquitoes had been fed on the same dengue patient and kept at a temperature of 22° C., for ten days. The batches were then fed on healthy volunteers ; None of the eight volunteers on whom the *pipiens* fed suffered in any way, whereas the cage of *Stegomyia* infected eight out of eleven volunteers.

An interesting fact noted was that if the mosquitoes are kept at a temperature below 16° C. they do not become infective or if they are infective and are kept for a few days at, or below, this temperature, they lose their infectivity, but regain it again if the temperature is raised above this point.

The authors, as a result of their experiences, consider that mosquitoes do not become infective until eight days after the infecting feed. Mosquitoes once infective remain so for life provided the temperature does not fall below 22° C. for any prolonged period. The most favourable time to infect mosquitoes is in the first three days of the fever, but experiment showed that the blood may be infective as long as fever lasts. It was proved that the virus of dengue in the mosquito is readily filterable.

An account is then given of attempts by the authors to infect laboratory animals. The dog and the rabbit are insusceptible. The white rat may show the presence of the virus in the blood some days after inoculation, but it is not possible to say whether this is a true multiplication of the virus. Monkeys show a true, inapparent dengue. They suffer in no way and have no fever, but if the blood is taken daily up to the fifth day it can be shown to be inert, whereas from the fifth to the tenth day the monkeys' blood is infective for man, thus showing a true multiplication of the virus; such monkeys can be shown to be immune to subsequent injection of virulent blood. It has also been found that in monkeys during the period when the blood is infective there is a remarkable alteration in the white cell count.

The authors are convinced that an attack of dengue confers a strong and lasting immunity although the serum of a convalescent has no inhibitory action when inoculated along with virus.

A chapter follows on the effects on the virus of heat, drying and various chemicals.

An account is also given of attempts to vaccinate against the disease by means of a mixture of bile and virus. This work has already been published and summarized [see this *Bulletin*, Vol. 27, p. 146]. Here it is noted that by means of a double inoculation, a first dose of 1/12 dilution of bile followed by a dose of 1/20 dilution (in the latter the virus is still active) immunity against inoculation with virulent blood is obtained.

D. Harvey.

CHOREMIS (K.). Denguefieber im Kindesalter. [**Dengue in Childhood.**] — *Jahrb. f. Kinderheilk.* 1930. Mar. Vol. 127. No. 1/2. pp. 104-109.

It has generally been stated, the author remarks, that young children strongly resist dengue infection. In the first year of the outbreak in Greece this opinion was confirmed, but when in 1928 the disease became pandemic very many children became infected. The author saw many cases. In very young children the alimentary system was principally attacked, and in many cases a condition resembling dysentery developed, with a maximum of seven or eight motions in the day. The fever as a rule remained high and fell by crisis; prolonged fever noted in older children did not occur in children in arms. Vomiting also was very common, and was often intractable. The eruption in small children was seldom typical, resembling a measles eruption and occasionally urticaria.

It is generally stated that in dengue there is leucopenia, but in small children leucocytosis is more common. No deaths were noted in babies, even in those with severe enterocolitis. Bleeding from the mucous membranes of the nose and mouth was fairly common and in one case, a girl of eleven years, nearly proved fatal. Treatment was symptomatic

and attention to nourishment was most important. Yatren was tried in cases of enterocolitis.

D. H.

AVARITSIOTIS. Sur le neurotropisme de la dengue. [**Neurotropism in Dengue.**—*Bull. et Mém. Soc. Méd. Hôpit. de Paris.* 1930. Mar. 24. Year 46. 3rd Ser. No. 10. pp. 441-444.

The author records the following as being due to the nerve toxin of dengue.

1. Influence on the central nervous system; this accounts for hypotension, fatigue, psycho-neuroses, etc.

2. Action on the peripheral nerves; neuritis, spasms, paralysis, itchings.

3. On the vaso-motor system; causing visceral congestion, haemorrhages, enlargement of spleen, liver and kidneys.

The author points out that nervous complications may follow an attack of dengue, e.g., neuralgia, and may persist for many weeks; the slow pulse rate may also continue long after the temperature has fallen to normal.

D. H.

TSIMINAKIS (Konstantin). Dengue-Epilepsie. [**Epilepsy in Dengue.**]—*Wien. Klin. Woch.* 1930. June 12. Vol. 43. No. 24. p. 755.

It was generally agreed during the epidemic of dengue in Athens that the virus was neurotropic, acting in some cases on the peripheral and in others on the central nervous system. The author himself observed three cases of epilepsy, following attacks of dengue at varying intervals. All three were in young people, aged 18, 22 and 22 years respectively, and in none was there any evidence of fits prior to the attack. The attacks were similar in all; they commenced with giddiness and tremor of the whole body, and were followed by loss of consciousness, with generalized muscular spasms; sleep followed and on awaking pains in the head and extreme exhaustion were complained of.

The author compares these cases with similar cases which he has seen following encephalitis.

D. H.

MEDULLA (Candido). Casi sporadici di dengue in Marmarica. (Nota epidemiologica.) [**Sporadic Cases of Dengue in Marmarica.**]—*Arch. Ital. Sci. Med. Colon.* 1930. Apr. 1. Vol. 11. No. 4. pp. 236-238. [13 refs.] English summary (6 lines) p. 239.

A few (10-12) patients presented themselves at the Hospital with a rash and slight rise of temperature in June, 1929, and from their histories and the course of the illness, the condition was diagnosed as dengue. They came from the interior of Marmarica (Cyrenaica). In addition, two Europeans were attacked; their cases are described and were typical. Search for mosquito larvae resulted in the discovery of *Aedes* and *Culex* in small collections of water near the new hospital.

H. H. S.

CAZANOVE (F.). Dengue et fièvre jaune. [**Dengue and Yellow Fever.**]—*Bull. Soc. Path. Exot.* 1930. Feb. 12. Vol. 23. No. 2. pp. 155-159.

Discusses the occurrence of these diseases in Senegal and suggests that the appearance of dengue should be regarded as an alarm signal showing that the danger limit of *Stegomyia* infestation has been reached.

D. H.

PETROV (V. P.). [**Epidemiology of Pappataci Fever in connexion with the Biology of Sandflies.**]—*Pensee Méd. d' Usbekistane et de Turquemenistane*. Tashkent. 1929/30. No. 1. pp. 1–16. [In Russian.]

The greater part of the paper is devoted to a review of previous data on the bionomics of sand flies in connexion with the epidemiology of pappataci fever. A brief account is given of the conditions which obtain in Middle Asia. This region has a typical continental climate with sharp daily and seasonal fluctuations of temperature. In summer (June, July, August) it is very hot, the temperature reaching 40–50° C. in the shade, while on the surface of the earth it may be as high as 70° C. In winter the temperature may fall as low as –28° C. The country is very arid owing to excessive evaporation brought about by low atmospheric pressure (716–728) and constant winds. The climatic conditions in Middle Asia thus appear to be unsuitable for the development of sand flies. However, a well developed system of irrigation has created artificial oases in towns and settlements, and since the sanitation in such towns is very unsatisfactory and the dwellings are of a type that affords good shelter to all kinds of insects, such places provide excellent breeding grounds for sand flies.

In Tashkent sand flies first leave their hibernating quarters in the middle of May; their number diminishes during the second half of June, in July and at the beginning of August, during which period the insect breeds and undergoes its metamorphosis. At the end of this period there is a considerable increase in their number. It was observed that the incidence of pappataci fever corresponds closely with the two periods of maximum increase in the number of sand flies. Variations in the meteorological conditions affecting the course of development of the insect influence the time at which the two peaks of the curve of incidence occur.

C. A. Hoare.

APOSTOLOPOULOS (Konst. G.). Das Dengue-Fieber in Athen im Herbst 1928. —*Muench. Med. Woch.* 1930. Feb. 14. Vol. 77. No. 7. pp. 265–268. With 2 charts in text. [2 refs.]

UNCLASSED FEVERS.

FLETCHER (William). **Typhus-like Fevers of Unknown Aetiology, with Special Reference to the Malay States.**—*Proc. Roy. Soc. Med.* 1930. May. Vol. 23. No. 7. pp. 1021–1027 (Sect. Epidemiol. & State Med. pp. 37–43). [30 refs.]

This paper is concerned with the typhus-like fevers transmitted by unknown vectors. Clinically these cases resemble real typhus very closely, but as a rule run a milder course. They are non-contagious. Health authorities are unanimous that they are not true typhus and that they are not a menace to public health.

These fevers fall into two groups, a rural and an urban. The rural group includes tick typhus of India and scrub typhus of Malaya. The urban group includes Brill's disease, endemic typhus of Australia, and shop typhus of Malaya. The disease in the rural group is apparently carried by ticks or mites. The vector for the urban group has not yet been determined.

The Weil Felix Reaction. The reaction in Malaya is positive in the urban group, but negative in the rural group when the ordinary X19 strain of *Proteus* is employed, but if a non-indologenic strain labelled "Kingsbury" is employed scrub typhus also gives a positive reaction.

Epidemiology. The urban form occurs sporadically all over the country but especially among people who are employed in grain shops. It is suggested that rats are the carriers and fleas the vectors. The rural form is a disease of open country, and occurs principally among coolies employed on the estates and especially those engaged in clearing scrub on old plantations. Rats are numerous, and large numbers of mites are found on them. It is possible that this disease like tsutsugamushi disease is conveyed by a mite.

In the discussion which followed, Dr. FELIX expressed the opinion that the K. strain of *Proteus* was really similar to X2, a strain which had been employed along with X19, of which it was a variant.

D. Harvey.

ANIGSTEIN (Ludwik). **Studies on Tropical Typhus in British Malaya. (Preliminary Note.)**—*Malayan Med. Jl.* 1930. June. Vol. 5. No. 2. pp. 62-64. [9 refs.] [Inst. for Med. Research, Kuala Lumpur, F.M.S.]

This is an account of some laboratory investigations into tropical typhus among Tamil coolies in Malaya, on the lines of similar work carried out by the author and others in Europe. Forty-eight cases were examined bacteriologically, all of which were similar clinically to cases described by FLETCHER. The Weil-Felix reaction was positive, in all but one with the Kingsbury strain of *proteus*; these were rural cases. The one case gave a positive reaction with the Warsaw strain and was an urban case.

Of two hundred guineapigs injected with human virus, 11 per cent. reacted, with fever, cachexia and death in one or two instances. Swelling of the scrotum was also sometimes noted. Post-mortem examination of these animals showed, in the majority of males, lesions of the testicles characterized by haemorrhagic exudate into the fatty tissues. Microscopic examination of smears from the tunica vaginalis showed numerous spindle-shaped, Gram-negative organisms resembling those already described in Mexican and European typhus. Examination of the brains of guineapigs revealed changes recognized as typical of typhus, i.e., perivascular infiltration and the presence of nodules consisting of mononuclear and glia cells.

Rats inoculated with human virus showed occasionally intermittent fever, with swelling of the scrotum, similar to that in guineapigs. The serum of some of these animals gave also a positive Weil-Felix reaction with the Kingsbury strain. Sixteen out of eighty rats inoculated with brain of guineapigs which had had no fever, but showed loss of weight and cachexia following inoculation with human virus, gave positive Weil-Felix reactions.

Wild rats collected in the district showed in some instances positive Weil-Felix reaction and swelling of the scrotum.

Pleomorphic bacterial organisms obtained in pure culture from blood and brain of human cases, when inoculated into rabbits and rats, produced a positive Weil-Felix reaction, and also typical lesions in guineapigs.

D. H.

TOULLEC (F.). Essai nosographique des fièvres typho-exanthématiques. [**Classification of Typhus-like Fevers.**]—*Bull. Soc. Path. Exot.* 1930. Feb. 12. Vol. 23. No. 2. pp. 152–153. [School of the Colonial Health Service, Marseilles.]

The author refers to the confusion at present existing in the classification of the typhus-like fevers. He suggests that although the etiological factors and the vectors may be different, yet these diseases may be grouped clinically under a definite group of symptoms, the three salient features being: (1) The temperature curve. (2) The rash. (3) The typhoid state of variable intensity.

Clinically such fevers as true typhus, Rocky mountain fever, the river fever of Japan, tropical typhus, all come under this syndrome, slight variations being due to the varying intermediate hosts.

The author suggests classification into two groups only.

- (1) Exanthematous fever due to lice.
- (2) Exanthematous fever due to ticks.

He supports his views by the statement that in typhus carried by lice the Weil-Felix reaction is positive, whereas in typhus carried by ticks this reaction is negative. [In view of the work of FLETCHER in Malaya and others this statement is hardly accurate, since with the use of certain strains of proteus positive reactions have been obtained in tropical typhus.]

D. H.

PEVERELLI (P.). De Proteus X 19-reactie volgens Weil-Felix. [**The Proteus X 19-Reaction according to Weil-Felix.**]—*Geneesk. Tijdschr. v. Nederl.-Indië.* 1930. May 1. Vol. 70. No. 5. pp. 436–443. [3 refs.]

The author examined 2,250 sera by means of the Weil-Felix test. The sera were partly samples sent in for the Wassermann reaction. A positive Weil-Felix test (1/200 and higher) was found in 29 cases (1.28 per cent.). Dividing the patients into those with and those without fever, in the former group 11.9 per cent. gave a positive result, in the latter, which may be regarded as controls, 0.57 per cent. Seventeen histories of patients are briefly quoted; many of them showed a positive test in high dilution. The results indicate that it is worth while to pay attention to the possible occurrence of "tropical typhus" in the D.E.I. Caution has to be taken in interpreting the results of the test, which should be repeated with different strains of proteus in various stages of the disease.

W. J. Bais.

CASTANEDA (M. Ruiz) & ZINSSER (Hans). **Studies on Typhus Fever. III. Studies of Lice and Bedbugs (*Cimex lectularius*) with Mexican Typhus Fever Virus.**—*Jl. Experim. Med.* 1930. Nov. 1. Vol. 52. No. 5. pp. 661–668. With 2 charts in text. [4 refs.] [Med. School, Harvard Univ., Boston.] [Summary appears also in *Bulletin of Hygiene.*]

The authors describe a series of experiments on lice which demonstrate that, under favourable conditions, the Rickettsiae present in the organs of guinea-pigs infected with Mexican typhus can be carried for 10 days in these insects, and that a ground-up suspension of such lice is still

capable of infecting normal guineapigs, with a typical febrile reaction and the appearance of Rickettsiae in the tunica. In other words, the Rickettsiae behave, in regard to the louse, as we should expect them to behave if they were the actual infective organisms.

Experiments with the bedbug (*Cimex lectularius*) showed that Rickettsiae from guineapigs infected with Mexican typhus can survive in these insects after intra-coelomic injection for ten days, remaining capable of infection. Bedbugs may also be infected by allowing them to feed on benzolized rats, in whose blood Rickettsiae have been shown to be present. Attempts to infect normal guineapigs by allowing infected bedbugs to feed on them, or by rubbing the faeces into the uninjured skin, have so far been unsuccessful.

W. W. C. Topley.

MARCANDIER & BIDEAU. Note sur l'épidémiologie de la fièvre exanthématique observée à bord des navires de guerre à Toulon. Rôle possible d'un acarien du rat dans la transmission. [**Epidemiology of Eruptive Fever observed on Battle Ships at Toulon. Possible Rôle of a Rat Acarus in its Transmission.**—*Rev. d' Hyg. et de Méd. Préventive*. 1930. May. Vol. 52. No. 5. pp. 353-364. With 2 text figs. [9 refs.] [St. Anne Hosp., Toulon.] [Summary appears also in *Bulletin of Hygiene*.]

The authors allude to the paper by PLAZY, MARÇON and CARBONI (*Bull. of Hyg.*, Vol. 3, p. 623) on a mild disease occurring in the French Navy and resembling the exanthematous fever of the Mediterranean coast described by D. and J. OLMER, BOINET and PIERI, DUNAN, BURNET, DURAND and CONSEIL.

They now record their observations on 52 naval cases treated in land hospitals or in the sick bays on the ships and showing the following annual distribution :

1926	...	...	...	3 cases
1927	...	...	...	14 "
1928	...	...	...	16 "
1929	...	...	...	19 "

The cases were most frequent among the men on board ship and particularly in a certain group of ships, as is shown by the fact that 46 of the 52 cases were among men on board and only 6 among the land staff, and of the 46 cases on the ships 41 were found among the large vessels forming part of the French Mediterranean Squadron. Only a comparatively small proportion of the crew were affected, ranging from 4.5 per cent. in one ship to 14.1 in another. The majority of the cases (63 per cent.) occurred among the machinists and stokers, the provisioning department being next most affected, whereas the staff on the bridge almost entirely escaped. Up to the present the disease has only been observed in ships which have been fully manned and during the periods of active navigation. The greatest number of cases were seen during the months of July, August and September, the seasonal distribution corresponding with that of the Marseilles exanthematous fever, and the *fièvre boutonneuse* of Tunis described by CONSEIL, although, apart from the summer months, isolated cases occurred on board the ships fairly frequently throughout the year. The contagiousness of the disease was very slight or even nil, no definite case of

direct or indirect spread of the disease from man to man having been observed in the land hospitals or sick bays, in spite of the close contact in which the men live.

As regards the mode of transmission, the authors are inclined to regard a rat acar, *Dermanyssus muris* (Hirst) as responsible for the following reasons :

(1) Rats and the incriminated parasite are most numerous in that part of the ship inhabited by the staff who are most affected by the disease.

(2) All the circumstances which facilitate and multiply the opportunities for contact between man on the one hand and rats and their parasites on the other favour the development of the disease.

(3) The disease is most frequent in the summer months when the parasites are most numerous.

(4) *Dermanyssus muris* was not found on the ships which remained immune from the disease.

J. D. Rolleston.

DURAND (Paul) & CONSEIL (Ernest). Transmission expérimentale de la fièvre boutonneuse par *Rhipicephalus sanguineus*. [**Experimental Transmission of Fièvre Boutonneuse by *R. sanguineus*.**]—*C.R. Acad. Sci.* 1930. May 26. Vol. 190. No. 21. pp. 1244-1246.

The authors attempted to transmit the disease by the bite of the tick, using monkeys as experimental animals, but all results were negative, owing, it is suggested, to the difficulty experienced in making the ticks bite. Accordingly some experiments were carried out on healthy volunteers.

Fifteen cc. of blood from a case of fever, taken early in the disease, inoculated into two healthy volunteers gave negative results. Five cc. of the blood from a dog which lived in the house of the patient and was infested with ticks inoculated into two volunteers gave negative results. Fifteen *Rhipicephalus* ticks were removed from the dog, washed in sterile water, crushed up in saline, and the emulsion inoculated into two volunteers. In one case five days later, and in the other seven days later fever commenced, with headache, and two days later the characteristic eruption appeared. The fever ceased at the end of ten days in one case and thirteen days in the other.

The authors consider that this result incriminates this tick as a transmitter of the disease, the reservoir of the virus being in this case the dog.

D. H.

JORGE (Ricardo). La fièvre exanthématique (fièvre escharo-nodulaire) et son apparition au Portugal. [**Eruptive Fever and its Appearance in Portugal.**]—*Bull. Office Internat. d'Hyg. Publique.* 1930. May. Vol. 22. No. 5. pp. 908-926. With 1 map & 1 chart in text. [3 refs.]

In view of the nodular lenticular rash and the initial eschar, or ulcer, the author suggests the name "fièvre escharo-nodulaire," but Tunisian observers claim that this disease is the same as "fièvre boutonneuse" and that that name should have priority.

The first case seen in Lisbon, in August, 1929, was in a young woman. There was a marked "tache noire" on the neck at the site of an insect bite. The Weil-Felix reaction was negative and the disease clinically typical of the Marseilles fever. A second and similar case was

reported on September 2nd. The primary ulcer was on the forearm. In a third case also, reported on September 21st, the Weil-Felix reaction was negative.

Dr. REBELLO of Gonvera, a small industrial town in the mountainous district in the interior, had in the year 1927 noted several cases of the same disease. Typhus is endemic in this area: but the cases of the new fever were readily distinguished by reason of their mildness and non-contagious character. In 1928 REBELLO noted twelve cases and in 1929 another twelve. In six cases the Weil-Felix reaction was tested and found to be negative. Cases have also come to light elsewhere in Portugal and have been reported, too, in Spain.

There follows a detailed description of the clinical aspects of the disease taken from the literature (already summarized in this *Bulletin*). As regards the identity with typhus or Brill's disease, the author holds that neither on clinical, epidemiological, serological nor experimental grounds could such identity be maintained. It is noted that in all three Lisbon cases there was a history of a recent visit to the country where the patients had come into close contact with dogs infested with ticks.

The author suggests grouping these diseases as follows:—

1. Fever with macular rash, without papules or primary eschar and enlarged glands; Weil-Felix reaction positive.

- (a) Epidemic typhus.
- (b) Brill's disease.
- (c) Rocky Mountain fever.

2. Fever with maculo-papular rash, with primary ulcer and adenitis; Weil-Felix reaction negative.

- (a) Fièvre boutonneuse.
- (b) Tsutsugamushi fever.
- (c) Tick-bite fever of Africa.

D. H.

OLMER. La fièvre exanthématique. [**Eruptive Fever.**].—*Marseille-Méd.* 1930. Jan. 25. Vol. 67. No. 3. pp. 144-146.

The author points out that the disease is no longer confined to the suburbs of Marseilles, but has also been reported from Nice, Cannes, Toulon and other Mediterranean towns, as well as from Madrid, Lisbon, and Rome. He is of opinion that cases should not be published as of this disease unless inoculation of the blood of the patient has been made into a guineapig. Such inoculation is positive in typhus but negative in eruptive fever. This should be followed, where possible, by inoculation into monkeys if full scientific proof is required. The author stresses these points in view of the diffusion of the disease, and he evidently believes that cases are now being returned as eruptive fever which have been insufficiently investigated.

D. H.

MEDULLA (Candido). Sopra alcuni casi di forma morbosa riferibile alla febbre bottonosa di Tunisi (o febbre eruttiva del Carducci) osservati in Cirenaica. Contributo alla casistica ed all'epidemiologia. [**Cases of Eruptive Fever occurring in Cyrenaica.**].—*Riforma Med.* 1930. May 12. Vol. 46. No. 19. pp. 721-722, 725-727. With 3 figs. [Colonial Hosp., Benghazi.]

The author quotes records of previous observers and has been able to trace 22 cases of fever of the Tunis type during the past 16 years. Lice

have not been found ; dogs are present in all the dwellings. During the period April-October when the disease is commonest ticks are seen on the dogs, and he suggests that the disease is transmitted by their agency.

H. H. S.

RAYBAUD (A.). La fièvre exanthématique en Italie. [**Eruptive Fever in Italy.**]*—Marseilles-Méd.* 1929. Dec. 25. Vol. 66. No. 36. pp. 792-795.

This is a summary of a paper published by CAVALLETTI, of the Polyclinic Umberto I of Rome, in the *Revista Ospedaliera* of July, 1929. It is recalled that CARDUCCI in Rome, in 1920, first described this malady which he had noted in the city since 1910. FALCONI in the same year described a similar disease.

CAVALLETTI notes that it has a marked seasonal character, cases being met with in Rome only from June to October. The clinical description accords with that of the observers in Marseilles and elsewhere in France. The disease is mild, although fatal cases have been met with, and PECORI records such a case in a young woman whose death was apparently due to the severity of the disease alone and not to any pre-existing disability, such as nephritis or tubercle.

In Italy the first attempts to obtain a positive Weil-Felix reaction failed, but the tests were carried out early in the disease. When the serum of convalescents was tested a fair percentage gave positive results, in one instance in a dilution of 1/3,200 ; but in most not higher than 1/200, or even 1/100. The Widal reaction was invariably negative. No parasite could be discovered in the blood either by microscopic examination or by culture. Examination of sections of skin revealed changes in and around the vessels resembling those of typhus. Examination for lice on the patients was negative. Occasionally ticks were found in their vicinity, particularly on dogs in the household.

CAVALLETTI is convinced that the disease studied in Italy is identical with the eruptive fever of Marseilles, although he is not certain that they can be identified with Brill's disease.

The reviewer, Raybaud, adds that the Marseilles fever, the eruptive fever of Italy, a similar fever described in Spain and macular fever of English observers are identical with the fever first described in 1910 by CONOR, BRUCH and HAYAT in Tunis under the name "fièvre bouton-neuse," and that this name has priority and, therefore, should alone be employed.

D. H.

i. AUDIBERT (Victor) & MURAT. Fièvre exanthématique grave avec myoclonie et mort. [**Fatal Case of Eruptive Fever with Myoclonus.**]*—Marseilles-Méd.* 1929. Dec. 25. Vol. 66. No. 36. pp. 799-800.

ii. BOUSQUET (A.). Trois cas de fièvre exanthématique observés dans la banlieue marseillaise ; rôle étiologique de la pique des tiques. [**Three Cases seen in the Suburbs of Marseilles.**]*—Ibid.* pp. 806-807.

i. Fatal cases of eruptive fever are very rare. This case was that of a gardener, aged 62 years, living in the suburbs of Marseilles. The fever was not high, but the patient showed marked weakness throughout the

illness, which was terminated by death on the fifteenth day. The authors suggest that the virus of this fever may be compared in its action with the virus of influenza and is a neurotropic virus.

ii. Three cases of eruptive fever observed in the suburbs of Marseilles, with special reference to their causation by tick bite. One patient stated that fifteen days previously she had been bitten by a tick on the leg; a "tache noire" developed at the site of the bite.

In the discussion which followed, several speakers quoted cases which supported the theory that the disease is conveyed by ticks.

D. H.

CONSEIL (E.). A propos d'une dénomination fièvre boutonneuse ou fièvre exanthématique. [**The Designation of Eruptive Fever.**].—*Presse Méd.* 1930. Apr. 26. Vol. 38. No. 34. p. 571.

Conseil points out that as it has been agreed that "fièvre exanthématique" of Marseilles is identical with the "fièvre boutonneuse" of Tunis the latter name should alone be used to designate the disease, since it was named thus in 1910 by Charles NICOLLE and the term fièvre exanthématique was not used until 1927. Apart from this the former name may give rise to confusion, since the typhus virus is named by some "virus exanthématique."

D. H.

DE (S. C.). **A Case of Spotted Fever (Rocky Mountain Fever, Tick Fever or Typhus Fever).**—*Indian Med. Gaz.* 1930. Apr. Vol. 65. No. 4. pp. 206-207. With 2 text figs. [1 ref.]

A case of fever in an Anglo-Indian, the guard of a train on the Bengal-Nagpur Railway. On examination: Temperature 103°, pulse 96, pain in the back and limbs, and considerable nervous prostration. On the fourth day a petechial rash of a coppery colour appeared on the forearms and legs, and within the next two days spread over the whole body with the exception of the face and forehead. A photograph shows its distribution two weeks after the temperature had become normal. In the author's opinion this case is similar to the cases of typhus-like fever described by MEGAW. There was no history of tick bite and no mention is made of the Weil-Felix reaction.

D. H.

PIJPER (Adrianus) & DAU (Helen). **The Aetiology of Tick-Bite Fever.**—*Jl. Trop. Med. & Hyg.* 1930. Apr. 1. Vol. 33. No. 7. pp. 93-94. With 3 figs. on 1 plate. [10 refs.]

Tick-bite fever is a well known clinical entity in South Africa and must not be confused with tick fever or relapsing fever. The disease is also known as Pretoria ten days fever, or Natal fever, according to the district. The bite of the tick gives rise to a typical primary sore followed by lymphangitis and fever. The disease resembles mild typhus and pseudo-typhus. It might also be compared clinically with Rocky Mountain fever, tropical typhus and tick typhus (MEGAW).

The authors have examined about a dozen cases during the last few years by blood culture, blood smear, dark field examination, scrapings of sores, etc., but without result. The agglutination reactions with the various strains of *Proteus* were negative. Inoculation of guineapigs intraperitoneally with the blood of patients taken at the height of the fever, however, was followed by a slight rise in temperature and when the animals were killed some enlargement of the organs, spleen, suprarenals and lymph glands, was noted. In blood smears in some of the

mononuclear cells Rickettsia-like bodies were found in small numbers ; as also in sections of the enlarged organs. Examination of the brains of these animals gave more definite findings ; in sections suitably prepared and stained definite cellular nodules (lymphocytes and mononuclears) were found, and scattered about among these cells very numerous Rickettsia bodies.

Figures are given illustrating these findings and the authors consider that the tick-bite fever of South Africa should be included among the diseases associated with Rickettsia.

D. H.

ARCHIBALD (R. G.). **A Case of *B. lactis aerogenes* Bacillaemia.**—*Jl. Trop. Med. & Hyg.* 1930. Mar. 15. Vol. 33. No. 6. pp. 80-81. With 1 chart in text. [2 refs.]

The author refers to cases of pyrexia of uncertain origin in the Sudan and the neglect or impossibility of blood culture. In 1911 four such yielding blood culture of a bacillus resembling *Bact. Cloacae* were described.

An adult native was admitted to the hospital with fever, rigors and diarrhoea. The liver and spleen were enlarged, there was a rapid pulse and a polymorphonuclear leucocytosis was noted ; cystitis also was present. Blood culture on the eighth day yielded a pure culture of a non-motile non-gram-staining bacillus. Four days later a second blood culture was taken and again the same organism was isolated in pure culture. An identical organism was also isolated from the urine, which was loaded with pus. The patient later became acutely ill with profound jaundice and symptoms of endocarditis, and died on the twenty-third day after admission. The biochemical reactions and other characteristics of this bacillus were typical of *Bact. lactis aerogenes*. No post-mortem was possible. The patients serum agglutinated the bacillus in 1/80. No agglutination of *Bact. typhosum*.

[This case can hardly be placed in the category of a pyrexia of uncertain origin. The case appeared to be one of septicaemia following cystitis.]

D. H.

SMYTH (F. G. A.) & CAMERON (W. M.). **Prolonged Intermittent Pyrexia associated with an Unusual Organism in the Blood-Stream.**—*Jl. Roy. Army Med. Corps.* 1930. July. Vol. 55. No. 1. pp. 42-46. With 1 chart in text. [1 ref.]

One is always chary of accepting "strange bugs" isolated in the process of blood culture ; there are so many pitfalls in the technique. But the technique here seems to have been so well safeguarded, and so carefully checked that one is forced to agree that this organism was actually circulating in the blood stream of the patients.

Three cases of intermittent pyrexia occurred among the British troops in Cairo in 1929, and all ordinary causes of pyrexia were carefully excluded. All three cases showed clinical features in common, namely, preliminary catarrh and sore throat, followed by prolonged intermittent pyrexia, with an erythematous rash on the thorax and extensor surface of the arms and legs. There was a leucocytosis of from 18,000 to 35,000 white cells per cmm., with 80 to 85 per cent. polymorphonuclears. There was an entire absence of toxic symptoms, and in two of the cases

a non-Gram-staining coccus (which was neither a meningococcus nor *melitensis*, but resembled *catarrhalis* somewhat) was isolated from the blood in pure culture. In one case the same organism was isolated from the blood on two occasions at an interval of a week.

The organism is under investigation.

D. H.

- JAMAL-UD-DIN. Short Term Fevers in the Punjab.—*Indian Med. Gaz.* 1930. July. Vol. 65. No. 7. pp. 365–367. With 9 charts in text.
- RUBINATO (Giovanni). Contributo alla febbre esantematica mediterranea.—*Policlinico*. Sez. Med. 1930. Oct. 1. Vol. 37. No. 10. pp. 500–508. With 1 text fig. [8 refs.] [Civil Hosp., Treviso.]

JAPANESE RIVER FEVER.

TANAKA (Keisuke), KAIWA (J.), TERAMURA (S.) & KAGAYA (J.). Beiträge zur japanischen Kedani-Krankheit. [**Kedani Disease in Japan.**]—*Zent. f. Bakt.* I. Abt. Orig. 1930. May 15. Vol. 116. No. 6/8. pp. 353–385. With 69 figs. on 8 plates. [Refs. in footnotes.]

Four kinds of *Trombidium*, or Kedani larvae, are commonly found on the field mouse in Japan: the true Kedani mite, which bites man and is the carrier of the Kedani virus; the second and third types, often confused with the first, called Pseudo Kamushi A and B; and the fourth type to which the name *Trombicula autumnalis japonica* has been given. The major part of this article is taken up with a minute description of these four larvae, with a view to differential diagnosis.

A short chapter on the pathogenesis of the disease is included. The generally accepted view is that the field mouse is the carrier of the virus and the mite conveys it to man by its bite. It has been noted, however, that although many mites may bite a man, the eschar, or primary ulcer, will only appear at the site of one bite, the presumption being that only a few mites convey the virus. The man on whom this sore appears develops the disease. The virus is injected along with the salivary secretion.

Tanaka in 1907 showed that the blood of a man ill with Kedani fever is infective; but prolonged search of the blood failed to reveal any parasite. The authors took 50 cc. of blood from the arm vein of a patient and placed it in sterile vessels in Ringer solution. The following day the red cells had separated from the plasma. Ten to 20 cc. of this plasma were injected into a monkey, but without effect, whereas doses of 0.5 cc. and 1 cc. of the blood produced the disease when inoculated subcutaneously, with incubation periods of 15 days and 8 days. A quantity as small as 0.2 cc. of blood taken from a patient on the eighth day of the disease produced a modified attack in a monkey. If the blood is kept for a few days it loses its virulence. The virus is also readily destroyed by alcohol, ether, toluol, etc., and a temperature of 50° C. for ten minutes.

With passage through monkeys the attacks become less and less severe. Apparently the virus is present in greatest quantity in the liver and spleen of the field mouse. The attempts to pass the virus

through a filter failed. Apparently the virus is either in or attached to the red cells, as it could not be passed through a Pukall filter, which allowed *prodigiousus* to pass.

Monkeys sick with Kedani fever were injected intraperitoneally with 300 cc. saline solution. This was drawn off after an interval of 6 to 12 hours and was centrifuged. The sediment consisted practically entirely of white cells and a few—very few—red cells; 0.3 cc. of this sediment injected into a monkey produced the disease after an incubation period of 14 days. This experiment would indicate that the virus may be carried on or with the white cells.

The Kedani virus has apparently a chemotaxic effect for, in the primary sore, invasion of polynuclear cells is noted. Mice, guineapigs and dogs are resistant to infection. Apparently the cercopithecus monkey is most susceptible, even more so than man.

Attempts are being made to immunize men against the disease. A case of carcinoma of the uterus was treated with injections of Kedani blood, which produced an attack of fever followed by marked improvement in the general condition, somewhat on the lines of the treatment of G.P.I. by artificially-produced attacks of malaria.

D. Harvey.

DEL FAVERO (Ernesto). La febbre fluviale giapponese è essa limitata ai paesi di Estremo Oriente? [**Is Japanese River Fever limited to the Far East?**]*—Arch. Ital. Sci. Med. Colon.* 1929. Dec. 1. Vol. 10. No. 12. pp. 590–592. English summary (4 lines) p. 593.

The author reports the case of an Arab returning to Aden from Singapore who exhibited the symptoms of tsutsugamushi disease with an eschar on the right arm and axillary adenitis. He refers to an unpublished case under Dr. WAVES of a young European treated in the Singapore General Hospital, his disease being “diagnosed by Japanese physicians of known experience” as Japanese River fever. Other cases have been reported in Sumatra (1902) and in the Federated Malay States (1915 and later).

H. H. S.

ISHIWARA (Kikutaro) & OGATA (Norio). **A Contribution to the Knowledge of the Nature of the Virus of Tsutsugamushi Disease.**—*Tokyo Ijishinshi (Tokyo Med. News)*. 1928. July. No. 2581. [Summarized in *Japan Med. World*. 1928 Oct. 15. Vol. 8. No. 10. p. 276.]

The authors succeeded in passing and preserving the virus in the testicle of the rabbit. By this method of passage the virulence was increased. They also point out the fact that in the tissue of the inoculated testicle the presence of histoblasts and cell-inclusions could be demonstrated. The cell-inclusions appeared to be bacillary in form and when stained by Giemsa's stain showed evidence of bipolarity.

D. H.

MALARIA.

RECORDS OF THE MALARIA SURVEY OF INDIA. Calcutta. 1930. Oct.
Vol. 1. No. 3. pp. 205-428. With numerous illustrations.

These records contain so much that is of wide interest that it seems a pity that they are not all accompanied by concise summaries for the benefit of malariologists in other parts of the world. Major A. E. RICHMOND and Asst. Surgeon J. C. MENDIS report on malaria among troops in Peshawar during 1927. About Rs. 60,000 were spent on anti-malaria work during the three years 1925-1927, apart from the cost of the military personnel employed. The result was a failure; malaria remained as prevalent as before, though the usual drainage work, together with oiling and the use of Paris green, was carried out in all areas. The chief sources of anophelines are irrigation water and surplus tap water inadequately dealt with by drainage. The cantonment is very freely irrigated, and miniature swamps and pools are the result. The source of infection is the native bazaar population, among which gametocyte carriers are as common as they are rare among the troops. The barracks lie between the main mosquito-breeding areas and the native city of 90,000 inhabitants, which is practically continuous with the cantonment. Many soldiers are infected outside the barracks, while they are on leave in the town or on patrol duty, and this militates against the success of screening the barracks. The authors suggest that the proprietors of places of amusement should be compelled to keep their premises clear of mosquitoes, and that the bazaar population should be treated with quinine. Failing the screening of bungalows, they should be sprayed every three days with Flit, Mosquil (half the price of Flit), or kerosene. A vigorous prosecution of antilarval measures is necessary; infected insects are continually entering and leaving the barrack-rooms in which they remain for a very short time. Irrigation should be reduced to a minimum and, above all, proper drainage should be provided as soon as possible.

Mr. R. A. SENIOR-WHITE reports on malaria at Delhi. Some 20 years ago it was decided to transfer the capital of the Indian Empire from Calcutta which was practically free from malaria, to Delhi, where malaria was so rife that in some wards the spleen rates reached 67 per cent., and in the neighbouring villages they were as high as 96 per cent. The site originally chosen, on which His Majesty laid the foundation stone, was liable to inundation and was the most malarious part of the whole area. This was abandoned as the result of a malaria survey, and another site was selected in the neighbourhood. A great deal of drainage and filling was done, and the author's survey, made in 1927, showed that an enormous improvement had occurred, with a reduction of about 30 per cent. in the spleen rates in most parts of the city. The carriers of malaria in Delhi are: *A. stephensi*, which hibernates in the wells, and *A. culicifacies*, which breeds in water continually kept fresh by rain, and which the author considers to be solely responsible for the epidemic malaria of the Punjab. The principal causes of the prevalence of the two anophelines are: (1) excessive irrigation combined with deficient drainage; (2) flooding of the Jumna, with water backing up the drains; (3) wells. Delhi is a mass of wells, and the author considers them entirely responsible for such malaria as exists in the new city; he found one with *A. stephensi* breeding in it, in the compound of a

European hospital where the nursing staff was suffering from malaria. He recommends : (a) the control of irrigation ; (b) a study of irrigation malaria by a joint committee of officers of the malaria, canal, and irrigation departments ; (c) a new system of drains to prevent the blocking-back by the Jumna ; (d) filling of borrow-pits ; (e) closing of wells ; (f) the appointment of a malaria officer.

Lieut.-Col. McCombie YOUNG and Sub-Assistant Surgeon SVED ABDUL MAJID report on malaria in Sind, with reference to the probable effect of the new barrage across the Indus at Sukkar, which will probably be completed in 1931. This vast scheme aims at watering 5,900,000 acres of land, or 5,000 acres more cultivation than there is in the whole of Egypt, and it will lead to an enormous increase of land under wheat. The authors' conclusion with regard to the newly irrigated areas is that the resulting improved economic conditions of the people will raise their resistance to malaria. But, "as time goes on, and if water-logging of the soil occurs, less favourable conditions may be expected . . . When the rise in the water level is such that kalar (salt deposits) appears on the surface, the fertility of the soil will be diminished, and adverse economic conditions will lead to an increase of malaria. . . . The question of water-logging is probably the biggest problem in the scheme." In the rice-growing areas, the endemicity of malaria is higher than elsewhere. The water in the rice fields of Sind evaporates quickly, becomes brackish, and deposits the salts known as kalar. The brackish water is run off by the farmer, and the surface of the soil is washed by repeatedly running fresh irrigation water on and off. This waste, brackish water (pancho water) is drained off on to the most convenient low-lying land, where it forms swamps in which enormous numbers of anophelines breed. These swamps are the source of the malaria, not the rice fields themselves. To drain off all this pancho water would be "a proposition too Utopian to be seriously considered. . . . In rural Sind there is little or no scope for antilarval measures." The average householder with an income of about £7 10s. per annum, cannot even afford mosquito nets for his family, and "even treatment by quinine, on an adequate scale, although very necessary, presents administrative difficulties. . . . Apparently the only practical method of control is improving the economic conditions under which the people live."

Lieut.-Col. GILL contributes a paper on the relationship of malaria and canal irrigation in the Punjab. He concludes that irrigation has proved a great blessing (save in a few places) and that if water-logging is prevented, it will increase the health and wealth of the country.

W. Fletcher.

EIGHTEENTH ANNUAL REPORT, MEDICAL DEPARTMENT, UNITED FRUIT COMPANY, BOSTON, MASS. 1929. pp. 13-58, 65-103. [Sixteen papers on Malaria.]

The first part of that section of the report which is devoted to malaria deals with treatment, the latter part deals with the disease as it affects the Company's estates in Honduras, Panama, Costa Rica and Cuba.

Dr. N. P. MACPHAIL reports on the routine treatment of malaria at the Company's hospital in Guatemala. Three tablets of plasmoquine compound (0.01 gram plasmoquine, with 0.125 gram of quinine sulphate) are given every day for the first six days of treatment, together with 15 grains of quinine sulphate twice a day. No toxic symptoms have resulted from the administration of these small doses of plasmoquine,

to approximately 20,000 people, with the exception of one patient who appeared to have an idiosyncrasy for the drug. Severe cases with vomiting are treated with intramuscular injections of quinine preceded by the subcutaneous inoculation of 8 to 12 minims of a 1 in 1,000 solution of adrenalin chloride. Intravenous quinine has been abandoned on account of the alarming symptoms frequently induced by it. Dr. Macphail has "not found that the usual objections advanced against intramuscular administration of quinine need be considered. When carefully given . . . necrosis is practically unknown." Dr. K. P. A. TAYLOR, however, who is attached to the same hospital in Guatemala, states, in his contribution to this report, that he has observed abscess formation, necrosis, severe secondary haemorrhage, fatal septicaemia, and sciatic nerve paralysis to follow intramuscular injections. For this reason he has turned to the rectal administration of quinine, and his paper describing the methods adopted and the results of the treatment is reviewed below, p. 109.

The routine treatment adopted by Dr. B. M. PHELPS in the Puerto Castilla Hospital, Honduras, consists of 15 grains of quinine twice a day, without plasmoquine; but, just before the patient is discharged he is given two tablets of plasmoquine compound, to destroy the gametocytes.

In the sixteenth annual report of the Medical Department of the United Fruit Company, BARBER, KOMP and NEWMAN (see this *Bulletin*, 1929, Vol. 26, p. 939) reported that small doses of plasmoquine rendered a patient's blood non-infective for mosquitoes. Dr. Eugene P. WHITMORE describes, in the current report, his own experiments in confirmation of this work, and gives protocols of eleven cases. He found that a single plasmoquine dose of 0.02 grams (or 0.326 to 0.341 mgm. per kilo of body weight) given to a patient suffering from subtertian malaria prevented infection of mosquitoes fed 20 hours to several days after that single dose. A single dose of 0.206 mgm. per kilo of body weight was not sufficient. Dr. WHITMORE also contributes, in conjunction with Dr. J. H. ROE, a further paper on the study of the blood in blackwater fever (see this *Bulletin*, Vol. 27, p. 187). They found that "nitrogen retention is very commonly—if not generally—present; indicating disturbance in the secretory activity of the kidneys and that this nitrogen retention may be so marked as to give the blood chemistry picture of an acute nephritis . . . there is no evidence of any marked deviation from the normal in any of the other chemical constituents of the blood: notably, sugar, calcium, cholesterol and lecithin." The direct van den Bergh was negative, while the indirect was strongly positive, reaching a high figure in one case.

Generally speaking, the methods adopted by the Company's officers in their anti-malaria campaign, are treatment of those infected with malaria, and the use of Paris green as a larvicide. It is difficult in some places, when road dust is not available, to find a suitable diluent for the Paris green. Lime mixed with saw-dust has been used by Dr. P. S. MALARET on the Preston Division in Cuba; it has the advantage of leaving a white pellicle on the water, which enables the inspector to see at a glance which waters have been treated. Lime without saw-dust, and also wood-ashes, were found to be irritating to the hands of the labourers. Mr. J. MALTSBERGER describes the preventive measures adopted on the Chiriqui Land Company's banana division, which comprises a large area of about 100,000 acres, in the south of Panama, on the borders of Costa Rica. Dr. E. J. SALISBURY contributes a paper on

the control of malaria in Costa Rica ; which he remarks, incidentally, is a white man's country, with 80 per cent. of pure European stock. The cost of general drainage, in Costa Rica, would be prohibitive and, therefore, Paris green is relied upon. One part is mixed with 100 parts of fine river silt, which is the most convenient diluent available.

In 1929, " medical treatment including hospitalization, anti-malaria prophylaxis and sanitation, cost \$0.06 [3½d.] per employee per day ; and of this \$0.05 went to hospitalization, and \$0.01 to sanitation and anti-malaria work. During the two years of our intensive anti-malaria work, 719,000 five-grain tablets of quinine have been dispensed together with 325,000 doses of plasmochin compound tablets and 560,000 Pink Tonic Tablets as follow-up treatment, all at a cost of \$4,800 per year."

W. F.

SOUTHERN MEDICAL JOURNAL. 1930. May. Vol. 23. No. 5. pp. 417-469. With 11 charts, 2 graphs & 1 map. [26 refs.]—
Symposium on Malaria. [Twenty-two papers.]

The first of the papers in this symposium is the presidential address to the American Society of Tropical Medicine, on Recent Developments in the Control of Malaria, which was read by Dr. W. E. DEEKS in November, 1929. He pointed out that in the early days of the Panama Canal all medical treatment was given in the hospitals, which were over-crowded with malaria patients who had been lying ill for days in labour camps before admission. After their temperatures had been normal for five days they were discharged. Their blood was not examined on discharge, and they were probably reservoirs of prolific gametocyte infection, for, in 1926, Dr. H. C. CLARKE, working for the United Fruit Company, found that gametocytes were far more numerous in convalescents after treatment for acute attacks, than before treatment was begun. [See also R. GREEN, this *Bulletin*, 1929, Vol. 26, p. 931.] In order to prevent this, it is most important to begin treatment as soon as fever appears ; the sick must be sought out and treated in their homes. " It is the cases of frank relapse and acute primary infection that must be controlled if we are to prevent prolific gametocyte development ; and this can be effectually done by the prompt administration of quinine, in adequate dosage, at the onset of acute symptoms. . . . When the schizonts are destroyed and their proliferation prevented with quinine, no new gametocytes can be produced, as their source of production no longer exists." The malaria control program initiated on the United Fruit Company's estates in 1926 comprised : (1) Short radius mosquito breeding control ; (2) Repeated thick-film blood surveys ; (3) *Frequent visits to the labour homes, with the object of discovering the sick, and treating them immediately.* Patients were given " a sufficient supply of quinine and plasmoquine to provide a complete course of treatment, and were definitely instructed how the drug should be taken " ; (4) An educational campaign. As a result of these measures the number of admissions to hospital has fallen, the earning capacity of the labourers has increased, and the production costs are lower.

In a discussion following a paper read by Dr. T. H. D. GRIFFITTS on the use of Paris green in Georgia, Dr. Deeks made the following statements concerning malaria on the estates of the United Fruit Company. Although Paris green in a 1 per cent. dilution with dust has been used on these estates for several years, no instance of its toxicity to man or beast has been reported. (See also C. J. SCHUURMAN and

A. HUININK, Vol. 27, p. 582; also LOPEZ and G. DI MATTEI above, pp. 81-2). The methods of control are demonstrated to those in charge of labour; they inspect the quarters daily, and the sick found in camp are given 30 grains of quinine daily and two tablets of plasmquine compound once or twice a week. The quinine is continued for 4 days, after which, if the fever has not subsided, the patient is sent to hospital; if it has, quinine is kept up for 2 days, along with two tablets of plasmquine once or twice a week; afterwards, a modified Aitken's tonic tablet, containing 2 grains of quinine, is given three times a day. Trained sanitary inspectors visit the estates from time to time in order to supervise the work. When, in the neighbourhood of the labourers' quarters, there are large swamps which cannot be economically drained, "the only protection we can offer is to educate the people to protect themselves by screening and the use of nets. You cannot control the disease with quinine and plasmquine." Plasmquine has been found absolutely useless in the treatment of subtertian malaria, but it is used in small doses of 2 centigrams a week in order to sterilize carriers.

The symposium also contains an interesting paper by Dr. K. P. A. TAYLOR, on the administration of quinine by the rectum. The following technique was adopted: Two ounces of magnesium sulphate 1 hour before the evening meal. A soap enema at 7 a.m. At 8 a.m. 60 grains of powdered quinine sulphate in 2 ounces of olive oil, administered by means of a funnel connected with a soft rubber catheter, which has been introduced 2 to 4 inches into the rectum. The patient is told not to defaecate for 6 hours; rest in bed is generally necessary. The quinine mixture should be well stirred and shaken. The treatment is continued until the blood is free from parasites, i.e., 2 to 8 days. Satisfactory results in the reduction of temperature and the elimination of parasites were attained in eleven cases in which this method was tried. None of the patients was unable to carry out the treatment. [W. FLETCHER (see this *Bulletin*, 1925, Vol. 22, p. 816) found that the absorption of rectal quinine in solution was slow and uncertain, and that its administration by this route was not to be relied upon in the treatment of malaria. There was little or no cinchonism in Dr. Taylor's cases, in spite of the large doses of 60 grains. He attributes this to slow, but regular absorption of quinine. This point needs further investigation.]

Dr. J. B. ASCANIO-RODRIGUEZ of Venezuela and Dr. H. HANSON of Florida drew attention to the importance of hookworm infection in conjunction with malaria. The latter stated that in Florida quacks visited the country giving "shots" of sodium cacodylate, which they claimed were malaria-preventive. "Unfortunately it appears that the practice of physicians sometimes leads to the belief that both cure and prevention of malaria rest with the hypodermic. Many persons showed arms scarred with abscesses resulting from quinine inoculations."

In a paper which he read before the National Malaria Committee at Miami in November, 1929, Dr. W. V. KING discussed the question of anopheles and malaria in the Philippines. The disease on the island of Luzon is pre-eminently a disease of the foot-hills and is decidedly less important in the lowlands. There is very little malaria in the low-lying coastal district around Manila, which is full of swamps, nor is there much in the alluvial rice-growing plains although anopheles are very numerous, particularly in the salt marshes around Manila. In the high-lands and foothills, malaria is carried by *Anopheles minimus*, which breeds in clear, running, shady streams and is absent near the coast.

A. ludlowi, which is a formidable carrier in Java and Sumatra, is of no importance in the Philippines though it swarms in the salt marshes around Manila. Again, *A. maculatus*, which is the principal carrier in the Malay States, does not appear to be dangerous in the Philippines, though it is abundant in some places. It is noted that *A. minimus* is a wild mosquito, which does not remain in houses during the daytime. The malaria season occurs during the dry weather; probably because the torrential rains of mid-summer flush the larvae out of the streams. (See also MANALANG, this *Bulletin*, Vol. 27, p. 640.) Dr. Victor HEISER, in the discussion which followed this paper, said that it was a good illustration of the necessity of defining a problem before undertaking control measures; but for the preliminary survey, large sums might have been wasted on draining the lowland marshes. Dr. Heiser added that if malaria control is to be undertaken on a large scale in the Philippines, cheaper methods must be found than those which are used at the present time. W. F.

DE VOGEL (W.). Comparaison de la mortalité urbaine et rurale à Java. La malaria, cause de la haute mortalité dans les ports situés sur la côte septentrionale; mesures prises pour la réduire. [Urban and Rural Mortality in Java. Malaria the Cause of the High Mortality in the Northern Ports. The Means Taken for its Reduction.] —*Bull. Office Internat. d' Hyg. Publique*. 1930. Sept. Vol. 22. No. 9. pp. 1717-1736. With 1 chart & 5 maps in text. [1 ref.]

During the period 1912 to 1913 the general annual mortality—urban and rural together—was 20 per mille; but, in the three principal towns, Batavia, Samarang, and Soerabaja (ports on the north coast), the average mortality was 46.8. The cause of this high mortality was malaria, which acted by undermining the health and resistance of the population. Thirty years ago, Dr. de Vogel found that the death rate in Samarang was highest near the sea, and became gradually less farther from it. Where the death rate was highest, the spleen rate was 100 per cent. Everything pointed to salt water fishponds as the source of the malaria, and, although the water in them contained 28 parts of salt per 1,000, abundant anophelines were found breeding among the algae floating on the surface. In 1918-1919, van BREMEN showed that a similar state of affairs existed in Batavia. By means of mosquito cages suspended over the surface of the water, he made daily counts of the mosquitoes arising from a given area, and he estimated that the fishponds of the town let loose from 25 to 100 million mosquitoes on the population every day. The anophelines caught in the cages had a long range of flight, marked specimens were found 6,200 metres away from the point of release in windless weather. The fishponds produce two kinds of anopheles, *Anopheles rossii* and *A. ludlowi*. *A. rossii* is the more plentiful; its maximum production occurs in water with a concentration of 6 to 7 per cent. of salt, and it may be present in concentrations even up to 8 or 9 per cent. *A. ludlowi* is not found in water with a salinity beyond 4 per cent. Experimentally, the *A. rossii* of Java are almost as easy to infect as the *A. ludlowi*, but, in nature, *rossii* is rarely found infected. WALCH showed by serological experiments that this was due to the different habits of the two mosquitoes; he found that *A. rossii* fed on animals while *A. ludlowi* often fed on man. The problem presented by the fishponds appears to have been solved by WALCH and SCHUURMAN; the water is run out of the ponds every few

weeks, and all is laid dry to the action of the sun, except for a ditch round the periphery of the pond, in which the fish remain until it is filled again after all the surface algae have been destroyed by the heat. (See this *Bulletin*, WALCH and SCHURMAN, Vol. 27, p. 640.)

W. F.

FEDERATED MALAY STATES. **Annual Report of the Malaria Advisory Board for the Year 1929.** [WILSON (Christopher J.), Chairman.]—12 pp. 1930. Kuala Lumpur: F.M.S. Govt. Press.

This Report deals with a question of great importance. Species sanitation, or antilarval measures limited to the control of the dangerous carriers of a district, is, of course, far less complicated and expensive than operations directed against all the species of anophelines which may be present. *A. maculatus* (a fastidious stream-breeder) is the principal carrier of malaria in the Malay States; very large sums have been spent in eliminating its breeding places, and the results have been held up as an example of the success of the method. It appears from the report under review that *A. maculatus* is changing its habits, and that although, in the past, it was essentially a stream-breeder, its larvae have been found, on many recent occasions, in tins, household utensils, and the like. Mr. B. A. R. GATER, Entomologist, Institute for Medical Research, informed the Board that "*A. maculatus* was no longer a purely fresh water breeder, but had adapted itself to other conditions because of the gradual elimination of its natural breeding places by drainage and other antimalaria measures."

It has been suggested that trains may disseminate malaria. On several occasions, cases have occurred in parts of Kuala Lumpur where no breeding places could be found, and an inspection of the incoming mail-trains showed that considerable numbers of anophelines were brought into the town in this way.

The Entomologist reported to the Board that while he had caught a number of *A. maculatus* in a mosquito trap placed next to some coolie lines, he had caught none in the lines themselves. He concluded from this that the method of searching houses in mosquito surveys might lead to false conclusions as to the species carrying malaria. He found that adult *A. maculatus*, in captivity, lived for an average of 23 days without a blood meal. With a blood meal, they lived an average of 30 days, with a maximum of 40 days. Additional meals did not prolong life.

W. F.

IYENGAR (M. O. T.). **Jungle in Relation to Malaria in Bengal.**—*Indian J. Med. Res.* 1930. July. Vol. 18. No. 1. pp. 259-266. [1 ref.]

It is a common belief, shared by many medical men, that jungles are malariogenic. The author investigated this question in many parts of Bengal. The submontane zone, where jungles cover parts of the Terai on the west and the Duars on the east, is notorious for its malaria. *A. minimus*, *A. maculatus*, and other well-known carriers are found in the cleared areas, but, where the jungle remains, there are only harmless mosquitoes. In one notorious locality, with a spleen rate above 90 per cent., there was heavy breeding of *A. maculatus* and *A. minimus* in the cleared area at the edge of the jungle, while, a few yards within it,

the breeding of these species stopped altogether. The Sunderban area consists of a maze of islands cut up by a network of tidal channels. Some of the islands, on which rice is grown, are cleared and are bunded to keep out the tidal flood; others are covered by mangrove jungle. In the cleared area, the mosquitoes are so numerous that special precautions are taken to protect the cattle from them, and the inhabitants creep under mosquito-nets at dusk. Within the mangrove swamps, on the contrary, there are no anophelines and when the author had finished his day's survey work he took his boat there and halted for the night, thus entirely avoiding the mosquitoes. He found some pools in the jungle which were open to the sun, but yet were free from anophelines, and he believes that two factors are necessary for open-breeding: (1) exposure to sunshine, with consequent changes in the flora and fauna of the water; and (2) the availability of man and his domestic animals as food for the adult insects. He concludes that, "These observations point to a preservation of all existing jungle and to extension of jungle wherever feasible."

W. F.

ROY (D. N.) & CHOWDHURY (K. L.). **The Parasitology of Malaria in the Darjeeling Terai.**—*Indian Med. Gaz.* 1930. July. Vol. 65. No. 7. pp. 379-381. [School of Trop. Med., Calcutta.]

Malaria parasites were found in 53.5 per cent. of about 1,500 children examined in the Terai tea-gardens during 1929. The species indices were: Benign tertian, 40.3; Malignant tertian, 48.5; Quartan, 11.2. In the gardens on the Himalayan foot-hills parasites were found in only 10.8 per cent. Thin films were employed and none was examined for more than 6 minutes.

W. F.

MORIN (Henry G. S.). Sur le paludisme des terres rouges de Cochinchine. Ses rapports avec les anophèles du pays. Premiers résultats obtenus par la lutte antianophélienne. [**Malaria in the Red Soil Districts of Cochin China.**]—*Bull. Soc. Méd.-Chirurg. Indochine.* 1930. Feb. Vol. 8. No. 2. pp. 187-191. With 2 figs. [Pasteur Inst., Saigon.]

The majority of the hot-beds of malaria in Cochin China lie in the "red earth" [laterite] districts. *Anopheles maculatus* and *A. minimus* are the principal vectors. Six per cent. of the latter, caught in malarious houses, have been found infected. Precise figures for *A. maculatus* have not yet been obtained locally. Anti-anopheline campaigns have been carried out with success on two plantations. On the worst of these, drainage and the fumigation of the coolie-lines with cresyl vapour cost the estate \$2,219 in seven months. The daily sick rate of the coolies fell steadily from 20 per cent. to 3 per cent. (The seven months began in July and ended in January). The author calculated that 5,300 working days were saved, which, at 55 cents a working day, means a saving of \$2,815, a net gain of \$600. In addition to this, 60 hectares of land were reclaimed by the drainage, and a worn-out, depressed discontented labour force was made alert and happy. The individual coolies worked better, and most of them wished to sign on again at the termination of their contracts.

W. F.

PROCTER (R. A. W.). **Malaria in Native Reserves.**—*Kenya & East African Med. Jl.* 1930. Aug. Vol. 7. No. 5. pp. 141–146. [6 refs.]

The author suggests that malaria has been introduced into the highlands of Kenya within comparatively recent times, and he attributes the spread of the disease to the immigration of Europeans, which has increased the movement of natives who now go to and from work on estates, railways, and the like. Eight years ago, it was unnecessary to use mosquito nets in the higher parts of Nairobi, and there is every reason to suppose that malaria was no more common in the Reserves at a similar altitude. In those parts of the Kikuyu Province where transport facilities are good and there is much movement among the natives, malaria is making a steady advance into the higher and healthier areas. It is considered useless to attempt wide-spread antilarval methods, or even species sanitation, and the suggested remedies are, first, to make sure that every one suffering from malaria is adequately treated, and, secondly, to improve the economic condition of the natives by allowing them to grow crops of economic value. (See this *Bulletin*, 1929, Vol. 26, p. 907 (CAMPBELL).)

W. F.

LONGO (Domenico). La malaria in Tripolitania. (Nota clinico-epidemiologiche.) [**Malaria in Tripolitania.**]—*Arch. Ital. Sci. Med. Colon.* 1930. July 1. Vol. 11. No. 7. pp. 418–428. With 1 map in text. English summary (5 lines) p. 429. [Inst. of Trop. Path., Bologna.]

A map is given showing the principal towns and the degree of infestation with malaria. The chief malarial district is littoral but the zone extends from Zuara on the west to Jefren and Garian on the south and Tauorga on the east. The species of anopheles found are *A. algeriensis* and *A. mauritanus*. The cases, though few, are divided into indigenous and "metropolitan." Details of 30 of the former and 19 of the latter are shown in a table. *P. vivax* was present in 18 and 14 respectively, *P. falciparum* in 7 and 5, both parasites and *P. malariae* each once in the former.

H. H. S.

FRÉGONNEAU (Werner). Schiffsärztliche Malariaerfahrungen in Afrika. [**Malarial Experiences of a Ship's Doctor in Africa.**]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1930. June. Vol. 34. No. 6. pp. 330–336.

Cases came not only from the coast of Africa but also from the interior, and the infections, in order of frequency, were malignant tertian, benign tertian and quartan. The author used the thick film method with Giemsa stain for blood examination. For treatment he prefers plasmochin compound to quinine alone. In the treatment of blackwater fever he employs pure plasmochin with satisfactory results. In the prophylactic treatment of malaria he recommends quinine in doses of 0.2–0.3 gm. given every evening. In a footnote the editors

state that they have published this paper to show that it is quite possible for a ship's doctor to make precise observations.

E. D. W. Greig.

EARLE (Walter C.). **Malaria in Porto Rico.**—*Amer. Jl. Trop. Med.* 1930. May. Vol. 10. No. 3. pp. 207-230. [8 refs.]

Malaria is a serious problem in Porto Rico, especially in the coastal region where nearly one-third of the population have parasites in their blood. Sugar cane is the principal crop in the unhealthy areas, and its method of cultivation favours the breeding of the carrier *A. albimanus*. Sub-soil drainage is the most hopeful solution of the problem; Paris green has been found useful in some regions. Treatment of the sick is considered a most important part of the work.

W. F.

PRADO (Alcides) & CARVALHO (Adolpho E.). A disseminação da malária no Estado de S. Paulo. **Prevalence of Malaria in the State of São Paulo.**—*Archivos de Hyg.* Rio de Janeiro. 1930. May. Vol. 4. No. 2. pp. 21-30. With 1 folding map. English summary. Also in *Ann. Paulist. Med. e Cirurg.* 1930. May & June. Vol. 21. Nos. 5 & 6. pp. 94-97; 111-114. With 1 plate (map).

The author has produced a map showing the zonal distribution and the extent of prevalence of malaria in S. Paulo, divided into areas where malaria is almost unknown, and where it is of low and of "average" endemicity. There are no zones of high prevalence. Each year after heavy rains there is a temporary increase, but nothing which could be regarded as an epidemic. Benign tertian is by far the commonest form. [The letterpress is merely an amplification of the map.]

H. H. S.

SIMMONS (James Stevens), ST. JOHN (Joe H.) & REYNOLDS (Francois H. K.). **A Malaria Survey at Fort Stotsenburg, P.I.**—*Milit. Surgeon.* 1930. July. Vol. 67. No. 1. pp. 1-13. With 1 fig. & 1 map in text. [3 refs.] [Bureau of Science, Manila.]

Fort Stotsenburg lies at the foot of the Zambales Mountains, in a reservation traversed by streams, and malaria has always been a serious problem since the establishment of the port in 1902. There is a large native population living in the neighbourhood which furnishes a reservoir of infection. Previous surveys have shown that malaria in the Philippines is often a household disease which affects several members of a family. These families can be tracked down by finding children with enlarged spleens in the schools. Seventy per cent. of the malaria carriers in a community are found in families to which children with enlarged spleens belong. Instead of examining all the 3,540 natives at the Port, the authors examined the school children, and then took blood films from the families of those children with enlarged spleens. They examined the blood of 92 persons in all, and detected 62 carriers among them. As a control on these findings, 80 persons were examined who belonged to families in which all the school children had normal spleens, with the result that only two carriers were found. Used as an

adjunct to other antimalaria measures, and repeated at intervals of about six months, the detection and treatment of carriers should result in a material reduction of malaria.

W. F.

RILEY (William A.). **Malaria and Anopheline Mosquitoes in Minnesota.**—*Minnesota Med.* 1930. June. Vol. 13. No. 6. pp. 410-411. [6 refs.]

The mean summer temperature of Minnesota is only about 60° F., and this precludes the possibility of more than rare cases of malaria, but such do occur. *A. punctipennis* and *A. quadrimaculatus* are present, and whenever anyone infected with malaria comes into the state, there is the possibility of the disease spreading. It is estimated that more than 1,600,000 tourists visited Minnesota in 1929, and in each of the 381 automobile tourist camps there was a daily average of 33.27 persons.

W. F.

GRATCH (I.). La malaria nel Comune di Ravenna. Cenni storici ed epidemiologici. (**Malaria in Ravenna and Surrounding** [*sic*]. **Historical and Epidemiological Notes.**)—*Riv. di Malariologia.* 1930. Jan.-Feb. Vol. 9. No. 1. pp. 1-34. With 7 maps. [34 refs.] [English summary p. 94.]

The author sketches the prevalence of malaria in Ravenna from Roman times, but shows that it was not of serious importance till the latter part of the 18th century, when rice cultivation was taken up on a large scale. This led to widespread areas of infection, but at no time does it seem to have been very intense. The population of the Comune was 80,776 in 1928, and the total number of cases 612. Of these, 307 were benign tertian, 130 subtertian, 3 quartan; in 172 the species was not determined. In Fosse Ghiaia in 1928, 1.8 per cent. of the inhabitants showed *P. falciparum* gametes and 18 per cent. suffered from malaria in some form. The following year the latter figure fell to 4 per cent. Many factors contribute to this amelioration, since all the usual measures have been employed—drainage, water-works, quinine prophylaxis, the use of larvicides, etc. Leron, a mixture of various mineral oils, was given a good trial and was found to be better than Paris green.

H. H. S.

VINTI (Giovanni). Epidemiologia della malaria in provincia di Bologna. (Casi autoctoni e casi importati.) [**Epidemiology of Malaria in the Province of Bologna.**]—*Arch. Ital. Sci. Med. Colon.* 1930. June 1. Vol. 11. No. 6. pp. 338-347. With 1 map in text. English summary (2 lines). [Inst. of Colonial Path., Univ., Bologna.]

A study of the returns for the last 20 years or so has shown that malaria in Bologna has markedly diminished. A map is given showing the small areas in which the disease is endemic and others into which it is imported; the latter are much more numerous than the former.

Recent examinations have demonstrated the scarcity of infection in adults. In children up to 2 years of age, parasites were found in "15

per cent. out of 38," *P. vivax* in every case. When bonification is complete and quinine more widely distributed, it is hoped that malaria will disappear entirely from the Province.

H. H. S.

FRANCHINI (Giuseppe). Malaria a risaia. [**Malaria in Rice Fields.**]—*Arch. Ital. Sci. Med. Colon.* 1930. June 1. Vol. 11. No. 6. pp. 321-323. English summary (7 lines) p. 324.

In the Province of Bologna rice is grown in rotation, that is for 2 or 3 years at a time, after which the land is used for dry cultivation—wheat, hemp, maize—for an equal period. In the rice areas malaria is common, outside them only a few cases are met with. Cattle, horses and pigs are kept in small numbers in the former, and if visited in the morning the ceilings of the stalls and sties are covered with *Anopheles*, which breed in the pools. The animals being few in number do not suffice for the mosquitoes which then attack man. The author agrees with ROUBAUD that the cattle constitute a strong protective barrier, and in the dry areas *anopheles* are fewer and the number of cattle sufficient for them.

H. H. S.

MALARIA-COMMISSIE UIT DEN GEZONDHEIDSRaad. Jaarverslag over 1929 van de Malaria-Commissie uit den Gezondheidsraad [ALDERSHOFF (H.), Chairman]. [**Annual Report of the Malaria Commission of the Board of Health.**]—Reprinted from *Verslagen en Mededeelingen betreffende de Volksgezondheid*. 1930. July. 14 pp. [6 refs.]

This report is itself evidence of the importance of the malaria problem in Holland. It gives detail of the co-operation of localities and individuals in promoting antimalarial measures. Thus in Amsterdam in 1929 there were sent to be examined for malaria 532 preparations, of which 115 proved positive. In Alkmaar cheap quinine was distributed to an amount which worked out, on an average, to 0.6 gm. per head. A statement of malaria cases according to season, which had occurred in their practice, was furnished by some practitioners. The state of affairs as regards malaria is particularly up to date at Medemblik where systematic antilarval operations are being carried out with the support of the Rockefeller Foundation. Such antilarval operations were also carried out in Alkmaar and Amsterdam. For a water surface of 397,700 square metres 1,193 litres of paraffin were required. This was applied during the months May to September inclusive, and was distributed over 231,650 square metres of pond surface and 166,050 of ditch surface. In Amsterdam a systematic search of stables showed the presence of *anopheles* in 238 out of 1,775, while antimosquito measures resulted in the killing, on a rough estimate, of 2,674,000 *anopheles*. A search of houses in which malaria cases had occurred gave 1,273 *anopheles* in 38. Reference is made to the work of KORTEWEG, SCHÜFFNER and SWELLENGREBEL [see this *Bulletin*, Vol. 27, p. 648] on the latent period which occurs between infection and the actual outbreak of malaria in spring and early summer. Questions are raised in the report as to the value of drainage and reclamation in

swampy areas for real reduction of mosquitoes. The matter requires further investigation.

W. F. Harvey.

NIKOLSKY (A.). [**Spread of Malaria, and Counter-Measures in the Steppes of Middle Asia in Connexion with Increased Cotton Production.**].—*Pensée Méd. d'Usbéquistan et de Turquéménistan*. 1930. Vol. 4. No. 9-10. pp. 74-80. [In Russian.]

It is proposed, in connexion with the so-called "five-year-plan" of the Soviet Government to increase the area of cultivation of cotton in Middle Asia to such an extent as to dispense entirely with foreign imports towards the end of that period. The author reviews the situation from the epidemiological point of view and concludes that an outbreak of malaria is imminent, since all the necessary conditions will be present. On the one hand, the localities concerned (Golodny and Dalversin Steppes) are endemic centres of malaria, both Anopheles and human carriers being present; on the other hand, it is proposed to introduce into the country thousands of new workers from localities free of malaria, the provisions for housing being admittedly inadequate, and the breeding of mosquitoes being facilitated by increase of irrigation. All these factors taken together will, according to the author, inevitably lead to epidemics unless appropriate measures are taken beforehand. These are considered *seriatim*. Prophylactic measures such as mosquito-netting, better housing, quininization are out of question owing to lack of material and funds, and can only be applied to a small proportion of privileged workers (so-called "shock-groups"). The only remedies available are direct anti-mosquito measures and treatment of cases as they arise. As it is evident that no considerations of this kind will deter the Government from pursuing their program, a serious outbreak of practically uncontrolled malaria in Turkestan is to be expected.

C. A. Hoare.

THEOBALD (G. W.). **Malaria, Women and Quinine.**—*Proc. Roy. Soc. Med.* 1930. Aug. Vol. 23. No. 10. pp. 1491-1496 (Sect. Trop. Dis. & Parasit. pp. 31-36). [5 refs.]

The author concludes that "the withholding of some preparation of quinine from pregnant women suffering from malaria results in unnecessary loss of life, and is inexcusable, as the drug is more likely to prevent than to cause miscarriage and death of the foetus." Given in reasonable doses it is extremely unlikely to cause abortion, and there is very little evidence that it has any deleterious effect upon the child. Malarial toxins, on the other hand, may cause abortions, stillbirths, and deaths during the first week of life. Quinine taken prophylactically does not interfere with menstruation, conception, or pregnancy. Women should be medically examined before going to the tropics. Mosquito nets should drop sufficiently far from the edge of the mattress to make it impossible for any part of the body to touch the net. Women should wear a more mosquito-proof dress after sunset, unless they live in screened houses. Eastern tradition is bad for European men, and much worse for European women. Many women attempt to live lives in the East which they could not stand in the West.

W. F.

LE ROY DES BARRES (A.). Paludisme et chirurgie. [**Surgery and Malaria.**]*—Rev. Méd. et Hyg. Trop.* 1930. May-June. Vol. 22. No. 3. pp. 97-113. [80 refs.]

It is often said that whenever anyone who has lived in the tropics meets with an accident, or has to undergo a surgical operation, he is bound to have an attack of malaria. This is an exaggeration; and most of the observations on which this idea is based were made without the examination of blood films. Many rises of temperature after operations in the tropics are put down to malaria, though they have nothing to do with it. Trauma does sometimes precipitate a malarial relapse, but in this respect it does not differ from cold, fatigue, or other causes which lower the resistance of the patient. Malaria influences the course of injuries and the healing of wounds, because it causes anaemia and visceral changes which lower the resistance; it acts in this respect like many other infections. As for the intermittent haemorrhages which are said to occur in the wounds of malarial subjects, the author does not believe in them. Before operating on a malarial patient, the malarial infection and the anaemia should be treated. Chloroform should rarely be employed as an anaesthetic, because the liver is so often affected in malaria. Above all, the blood should be examined, preferably in thick films, if there is any rise of temperature after traumatism.

W. F.

KYRIASIDIS (K. N.). Ueber den Einfluss der Malaria auf den Widerstand des Organismus bei Tuberkulose. [**Effect of Malaria on Resistance to Tuberculosis.**]*—Deut. Med. Woch.* 1930. June 13. Vol. 56. No. 24. pp. 995-997. [29 refs.] [Evangelismos Hosp., Athens.]

The author determined the opsonic index to tubercle bacillus in 128 malarial patients, 69 acute and 59 chronic, all, except 8, being infections with *P. falciparum*. He tested the von Pirquet reaction in 125 adult cases of malaria. He concludes from his immunological observations that: (1) the reaction of von Pirquet and the opsonic index indicate that malaria does not produce favourable conditions for tuberculosis; (2) the increase of opsonin in the serum shows that, in chronic malaria, the body offers powerful resistance to the development of tuberculosis.

E. D. W. Greig.

MERZBACHER (L.). Die Beziehungen der natürlichen Malaria zur Syphilis. Ergebnisse einer Studienreise nach den Nordprovinzen Argentiniens. [**Relation of Natural Malaria to Syphilis. Results of Study Tour in Northern Provinces of Argentina.**]*—Deut. Ztschr. f. Nervenheilk.* 1930. Apr. Vol. 113. No. 1/3. pp. 1-49. With 1 text fig. [3 refs.]

In the year 1915 in the provinces of Salta and Jujuy 61,734 persons were treated at the antimalarial centres. The population is 240,000. Fifty-five per cent. were attacked by benign tertian, 12 per cent. by quartan, and 4 per cent. by malignant tertian; the remainder were mixed infections. In the months of March and April 1920 in Jujuy, 65 per cent. of the children showed

definite signs of malaria, and in Salta during the same period, 81 per cent. The investigation was carried out by questionnaire to 400 medical men, and by a study of cases at San Roque Hospital, Jujuy. One hundred and twenty cases were studied clinically and serological examinations of the blood and cerebrospinal fluid were made. The author concludes that the severest forms of post syphilitic diseases are very rare in malarial areas, which here regards as a striking indication of the curative effect of natural malaria. The paper contains a series of tables giving full records of the observations.

E. D. W. Greig.

VARGAS (Abel). E' a malaria possivel em qualquer região de anópheles? (Nota prévia.) [*Is Malaria Present wherever there are Anopheles?*] — *Folha Med.* 1930. Aug. 15. Vol. 11. No. 23. pp. 272-275.

The author answers this question in the negative and gives instances of localities where there are malarial patients and anopheles but no proved transmission from the sick to the healthy; also in the suburbs of Rio de Janeiro malarial incidence has fallen without any reduction in anopheles. He mentions the various hypotheses to explain this, such as immunity on the part of the mosquito (maintained by ALESSANDRINI and controverted by S. P. JAMES), the nature of the food of the mosquito, e.g., cotton, alfalfa, preventing development of the gametocytes, and the food preference of mosquitoes for the larger domesticated animals rather than man.

He concludes, however, that the cause is that malaria is contracted in the houses, and that in the districts where anopheles is present but malaria is not the mosquitoes come into the house merely for a feed and then disappear to lay their eggs, for examination of those caught in the dwellings in Parahyba, for example, proved them to be uninfected.

H. H. S.

CIUCA (M.), BALLIF (L.) & VIERU (M.). Immunité dans le paludisme expérimental. [*Immunity in Experimental Malaria.*] — *Arch. Roumaines Path. Expérim. et Microbiol.* Paris. 1930. June. Vol. 3. No. 2. pp. 209-229. With 1 text fig. [23 refs.]

A high infant mortality is characteristic of intensely malarious countries; but, after the third year of life or of residence in such a country, an immunity is acquired; this, however, is not proof against a new strain introduced by immigrants. The authors have made observations on a group of 518 patients who were receiving therapeutic inoculations for general paralysis and other diseases, and they have reached the following conclusions:—

1. In Rumania, the percentage of positive results following a single inoculation of virulent benign tertian blood is 53·3; in quartan it is 61·3; in subtertian it is 80.

2. A percentage of 18·6 of the benign tertian cases, 15 per cent. of the quartan, and 18 per cent. of the subtertian, have parasites in their blood without fever or symptoms. Most of these (the quartan not so readily) get rid of their parasites without treatment.

3. After repeated inoculations of benign tertian blood, an immunity is obtained in 100 per cent. which will resist the inoculation of 65 to 220 cc. of virulent blood infected with the same strain of parasite; but only 67 per cent. will resist inoculation with another strain of benign tertian.

4. Immunity follows the repeated inoculation of a quartan strain in 72 per cent.

5. There is no cross immunity between the three types of parasite.

W. F.

- i. TEGONI (G.), with the collaboration of AURELI (B. Williams). *Indice bibliografico della malaria. III. 1928. Index to Malaria Literature.*—Supplement to *Riv. di Malariologia*. 1930. Vol. 9. 114 pp. [Experim. Station, Anti-Malaria Campaign, Rome.]
- ii. MOUFEL (P. P.). *Indicateur bibliographique des travaux russes sur le paludisme. [Bibliography of Russian Malaria Literature.]—Russian Jl. Trop. Med.* 1929. Vol. 7. No. 9. pp. 582–597. [In Russian.]

i. Since 1928 the Stazione Sperimentale per la Lotta Antimalarica at Rome has published as supplements to the *Rivista di Malariologia* yearly bibliographical indexes to malaria literature. The first and second of these supplements covered the malaria literature for the years 1926 and 1927, that under notice records the more important papers which appeared in 1928. Over 1,500 references are given, classified under ten main headings: General articles, Congresses and Reports—History, geography, etc.—Economical and technical programmes and projects—Parasitology—Pathology and clinics—Anopheline mosquitoes—Epidemiology—Control—Malarial therapy—and Haemosporidia in animals. The numerical classification used for malaria references in the library of the Stazione Sperimentale is given in an Appendix.

ii. Dr. Moufel's bibliography of Russian papers on malaria supplements four earlier lists which appeared in the *Russian Journal of Tropical Medicine* in 1924 (No. 2, pp. 74–77), 1926 (No. 1, pp. 28–64), 1927 (No. 7, pp. 450–467) and 1928 (No. 1, pp. 63–65). This latest list gives 689 additional titles collected from some 94 Russian medical journals (of which less than 10 per cent. are readily to be seen in London). With the earlier lists it brings the total of recorded Russian papers on malaria to over 2,600, of which 1,400 by some 1,000 Russian authors have appeared since 1922. Relatively few of these titles have found their way into other bibliographies of malaria.

R. L. S.

DEEKS (W. E.). **Progress in Malaria Control.**—*Jl. Trop. Med. & Hyg.* 1930. Apr. 15. Vol. 33. No. 8. pp. 101–103. [3 refs.]

In order to control malaria, we are compelled to wage war on mosquitoes; but our efforts must be restricted to short-radius sanitation around habitations, because it is impracticable to deal with very large areas. Where anti-larval measures would entail unjustifiable expense, screening must be employed instead. The treatment of the human carrier is of the greatest importance. The only known specific remedies which will destroy the schizonts are the salts of quinine [?the cinchona alkaloids]. The gametocytes can be destroyed by plasmoquine: Eugene WHITMORE has found that if a single dose of 2 centigrams is given to a gametocyte carrier it will render him non-infective to mosquitoes for a period of seven days (see Report of United Fruit Co. above p. 106). Labourers should be congregated in camps or villages on carefully-chosen sites, in order that the areas requiring sanitation may be restricted to narrow limits in which schools, dispensaries, and medical attendance will be available. One of the essential requirements in the control of malaria is an adequate and well balanced food supply.

The administration of quinine can be safely left in the hands of the intelligent laymen, who can also give plasmoquine, the small non-toxic doses of which will prevent the infection of mosquitoes; thus "the control of malaria has become a home and lay problem instead of a hospital and skilled medical problem. Intelligent medical supervision supplemented by a technician to check up progress reports, and a co-operating organized lay personnel educated in some elementary essentials should be able to control malaria in any tropical district to the extent of its ceasing to be a serious economic problem." This plan is proving successful in the plantations of the United Fruit Co., and, during the last four years, there has been a steady fall in the number of cases requiring hospital treatment; in 1925 the rate was 239 per thousand; in 1929 it was 89.

W. F.

SCOTT (G. Waugh). **Report on Malaria Prevention Work carried out at Chenderoh.**—*Malayan Med. Jl.* 1930. Sept. Vol. 5. No. 3. pp. 86-89. With 8 figs. on 4 plates.

This paper describes the success of antilarval measures in a large engineering undertaking. A big dam was being constructed across the upper reaches of the Perak River, by the Hydro Electric Power Company. A clearing was made in virgin jungle, and the labour force began to assemble before the felled timber was removed or drains could be made. *A. maculatus*, the notorious carrier, began to breed in the swamps and streams exposed by the felling of the jungle; all the conditions favoured an epidemic of malaria, but this was prevented by the measures adopted, and a labour force of more than 4,000 people, including over 100 Europeans, was kept healthy and contented. The death rate for the 3 years occupied in constructing the dam was only about 4.5 per mille, and there were only 8 cases of malaria among the Europeans during the whole period. Labourers, living a little over a mile away, under similar conditions apart from antilarval measures, suffered severely from malaria. The measures adopted were: (1) Regular weekly oil-spraying of all water surfaces within half a mile of the camp, or up to the edge of the virgin jungle in which *A. maculatus* does not breed. (2) Reduction of water surfaces by drainage. Open drains were made and kept oiled; subsoil drains were employed in the portion of the clearing which is to be occupied permanently. Irregular streams were canalized and trained. (3) All fever cases were sought out and taken to hospital; no case was allowed to remain for more than one day in the coolie lines.

W. F.

THOMPSON (T. O.) & GRANT (P. F. A.). **The Cantonment Antimalaria Problem. Afterthoughts.**—*Jl. Roy. Army Med. Corps.* 1930. May & June. Vol. 54. Nos. 5 & 6. pp. 368-376; 434-439. With 2 text figs.

The authors are of opinion that mosquito destruction is not a suitable method for the eradication of malaria in Indian cantonments, and that "therefore we must fall back on protection, the individual protection of the mosquito-net and the mass protection of the proofed barrack." The dictum of CHRISTOPHERS, SINTON and SCOVELL, that a malaria survey should always be made before undertaking any action

in regard to the prevention or amelioration of malaria, they regard as a counsel of perfection. The military anti-malaria officer has not the time necessary for this; in support of this statement they recall the case of an anti-malaria officer who was also officer in charge of a dermatological section, officer detailed for training stretcher-bearers and sanitary squads, officer in charge of medical wards, medical officer in charge two units and the R.A. Brigade, and temporary staff surgeon as well. They urge the importance of trustworthy statistics in connexion with malaria, so that its cost to the army may be shown in figures which the lay administrator can understand. "We want," they say, "to be able to go to the purse-holders and say, 'Look here, in such and such a cantonment the cost, the actual cost of malaria during the last three years has been so much.' . . . It would be a great help if some general figure of the total cost of each malaria case could be obtained." There are many army returns which give the reputed number of malaria cases, but the authors doubt if these represent the true facts of the case; there has been much hiding of cases by detaining mild cases or treating them in barracks, possibly with the object of avoiding censure from higher authorities. They strongly recommend the treatment of all malarious children of troops and followers, in order to protect the soldiers. They have found it useful to spray the barracks with a solution composed of 98 per cent. kerosene and 2 per cent. carbon tetrachloride; fumigation proved useless. They also recommend the keeping of spot-maps showing the breeding-places of mosquitoes, and the position of the bed occupied by every case of sickness. They deplore the ignorance which prevails even among those who are supposed to know; for example, an R.E. officer responsible for the expenditure of several thousands of rupees of anti-malaria funds was asked in an examination paper to describe what anti-malaria measures should be carried out under certain conditions. His reply was, "Burn all litter to prevent breeding of mosquitoes."

W. I.

MCLEAN (N.). **A Tour of Anti-Malarial Activities in Europe.** — *Kenya & East African Med. Jl.* 1930. May. Vol. 7. No. 2. pp. 46–53.

The author was a member of a party of 10 medical officers and entomologists who attended a special malaria course organized by the League of Nations in 1929. Lectures and demonstrations were attended at the London School of Hygiene and Tropical Medicine during June, in Italy during July, and at the Institute of Tropical Medicine at Skopje, Yugoslavia, during August. In connexion with the London course, mosquito control schemes were studied at the British Mosquito Control Institute in Hayling Island. A large part of the time spent in Italy was occupied in visiting various parts of the country where operations were in progress. Bonification works are classed as: (1) Hydraulic or grand bonification, by which is meant the conversion of swamp land into land suitable for agricultural purposes by means of drainage and irrigation canals together with their pumping stations. And (2) integral bonification, which follows hydraulic bonification and consists of all measures directed at improving the economic conditions of the agricultural population which settles on this land, by: (a) good housing; (b) stabling of domestic animals; (c) control of mosquitoes; (d) building of good roads. (See also LUTRARIO

below, p. 125). As a result of these measures malaria is diminishing rapidly, while the ancient agricultural activity is being reconstituted under modern methods.

Drainage is not sufficient by itself, the soil becomes too arid, and it is necessary to have recourse to irrigation and anti-anopheline measures. The large drainage canals of Ostia constituted, for 40 years, extensive breeding places for anophelines, and malaria continued until anti-mosquito measures were adopted. The statistics of control stations show that, in the Campagna, no other means of malaria control can compare with Paris green as regards effectiveness and inexpensiveness. At Massarosa, the party saw an anopheline area where there was no malaria. There were many anophelines in the cow-sheds and pigsties, but very few in the farm houses. The spontaneous abolition of malaria in this area is attributed to a change in the habits of the anopheles for whose nutrition animals are taking the place of man. "For this phenomenon to occur it is necessary that dwelling-houses should be well lighted, airy, and with white-washed walls." (But see J. G. THOMSON below.) In the Pontine Marshes, large drainage canals were being made with modern mechanical excavators. In some of the neighbouring country which had been brought under cultivation, screening was the only method of protection employed; in other places, Paris green was being used. The party also visited the great bonification works at Ferrara, in Northern Italy, which were started several years ago, and have been responsible for the reclamation and irrigation of thousands of acres of marsh land. This reclamation, combined with good housing and a system of mosquito control, has produced a healthy and prosperous agricultural population. At Monfalcone there was a vast swamp too difficult to drain; this was sprayed with Paris green by aeroplane, with the result that the town became healthy. "The successful and extensive use of Paris green . . . was one of the most striking features of an interesting and instructive tour." In Yugoslavia, the party visited farms, drainage works, and schools in the neighbourhood of Skoplje, where malaria is being reduced by drainage and the extensive use of Paris green; outside the towns there is much malaria. In the mountainous districts, where *A. superpictus* is the chief vector, Paris green is being used with some success.

W. F.

THOMSON (J. G.). **Observations on the Antimalaria Campaign in Italy.**
—*Proc. Roy. Soc. Med.* 1930. May. Vol. 23. No. 7. pp.
1011–1016 (Sect. Trop. Dis. & Parasit. pp. 15–20). [7 refs.]

Dr. Thomson visited Italy, in 1929, at the joint invitation of Professor MISSIROLI, the Director of the Anti-malaria Station in Rome, and Dr. HACKETT of the Rockefeller International Board of Health. He was chiefly impressed by the thoroughness and success of the measures adopted for mosquito control, and particularly by the efficacy of Paris green.

"The anti-malaria campaign in Italy is an attempt to eradicate malaria by anti-larval measures. . . . Quinine was for many years almost the only method used to diminish malaria in many parts of Italy, but, here again, the difficulty of efficiently controlling the use of this beneficent drug led to disappointment. The Italian Government, through its Health

Department, having taken into consideration all the varied factors likely to be encountered, have adopted anti-larval measures as the most important means of diminishing malaria."

Breeding places which cannot be filled or drained are treated with larvicides. At Sermoneta, on the edge of the Pontine marshes, at Portotorres in northern Sardinia, and at Siniscola, the use of Paris green has resulted in a great decrease of malaria. The Paris green (a double salt of arsenite and acetate of copper, containing 58.62 per cent. arsenious anhydride) is obtained from Siegle & Co., of Stuttgart, and from William Sattler of Schweinfurt, at a price of 10 lire (26 pence) per kilo. It floats on water for about twenty-four hours and then sinks; rain makes it sink more quickly. One litre of a 1 per cent. mixture with fine road-dust is sufficient for 100 square metres of water. The mixture can be safely applied to water because the arsenic is volatilized by various moulds and disappears in 48 hours. It is harmless to fish, and it does not destroy culicine larvae. The frequency with which Paris green should be spread depends on the rate of development of the larvae. In Italy, the water is treated every 20 days up to the end of April, every 15 days up to the end of May and every 10 days from June onwards. Malaria has disappeared spontaneously from certain parts of Italy, such as the Val di Chiana and Massarosa, where *A. maculipennis* feeds almost exclusively on cattle, and does not go into the houses, though they are the same dark, ill-ventilated places that were in use when malaria was prevalent. (But see N. McLEAN above, p. 122).

In the discussion which followed this paper Colonel S. P. JAMES said that he thought Dr. Thomson had somewhat unduly emphasized one aspect of the work in Italy. Quinine treatment and prophylaxis had brought about a rapid and continuous decline of malaria mortality, from 500 per million in 1900 (the year when the State quinine law was promulgated) to only 61 per million in 1923. More than £8,000,000 was being spent on the bonification schemes of the Pontine marshes and the Tiber delta. Dr. E. STOLKIND who had studied the anti-malaria campaign in Italy also testified to the successful results of wholesale quinine distribution in the country. (See also A. CELLI below, p. 126).

W. F.

HACKETT (L. W.). **Malaria Control through Anti-Mosquito Measures in Italy.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1929. Apr. 25. Vol. 22. No. 6. pp. 477-499. With 4 graphs, 1 map & 1 plate. [7 refs.]

The Malaria Experiment Station in Italy is a collaborative undertaking between the Rockefeller Foundation and the Italian Government; Professor MISSIROLI is the director. It was founded in 1924 for the purpose of finding out if malaria could be controlled by simple inexpensive anti-mosquito measures, and a rigorously imposed condition was that the expenses should not exceed the sums actually being spent by the community on malaria treatment. Field stations were established in Sardinia and Calabria in 1925; the work has now been extended to 15 localities, and this report is chiefly concerned with Portotorres in Sardinia, a town of 6,000 inhabitants, notorious for its malaria. When work was begun, about half the people had chronic malaria, but the application of antilarval measures, over a period of four years, reduced

the parasite index from 34 to 3, the spleen index from 47 to 13, and the reported cases from 1,300 to 200. The infant infection rate, not known at the outset, was 4 per cent. in 1925 and only 0.8 per cent. in 1928. The causes of malarial prevalence were a sluggish river, three or four marshes, and many miscellaneous collections of standing water. The principal carrier was *A. maculipennis*.

The method adopted was dusting with Paris green and the results were almost miraculous. Each succeeding year, there were caught at the catching stations established at the periphery of the town only about half the number of anophelines caught during the previous year. The Paris-greening was begun in the spring as soon as fourth-stage larvae were found, and it covered a radius of three kilometres from the edge of the town. The annual cost of antilarval measures, for the four years, averaged 22,500 liras (£245): the annual cost of medical treatment, before the work was undertaken, was £270 to £330 a year, including 12 kilograms of quinine. The trend is toward complete disappearance of malaria in Portotorres; this is reflected in the social and economic changes which are taking place in the town. Previous to 1925, no one from out of the town would willingly spend the night in it, but now families are moving in and hotels are being built. During the first year, quinine was given to malarious children, but this treatment of the sick did not prevent transmission or reduce the total malaria. At Bianconovo, one of the most malarious places in the region, malaria practically disappeared at the end of three years through antilarval measures alone. At Torpe, in northern Sardinia, quininization was tried without anti-mosquito measures. There was little or no success; it did not prevent a rise in the parasite and spleen rates in the epidemic year of 1928; though, during the same period, Portotorres became the least malarious community in Sardinia.

In scattered rural populations, the burden of prevention must be shifted from the community to the individual, who can protect himself by screening and antilarval measures. This has been proved in a portion of the Roman Campagna called the Valchetta, in which the houses are screened and each owner applies Paris green to breeding places; malaria has been almost eradicated by this method in three years. Dr. Hackett contends that where there is much malaria there are also many man-biting anophelines. If there are many anophelines without malaria, the anopheles are not man-biting carriers. If there is much malaria without anopheles, it is probably accounted for by the peak of mosquito density preceding the malaria peak by four to six weeks. In Italy there is a remarkable drop in anopheline density late in July and August. In August the annual epidemic of malaria is in full swing, when practically no mosquitoes can be found.

(See also MISSIROLI, this *Bulletin*, Vol. 27, p. 219.)

W. F.

LUTRARIO. Quelques idées sur les "bonifications" en Italie. [**Bonification in Italy.**].—*Bull. Office Internat. d' Hyg. Publique*. 1930. Apr. Vol. 22. No. 4. pp. 714-721. [11 refs.]

What does the word "bonification" mean in Italy? It comprises three classes of fundamental measures in the campaign against malaria. These are: (1) Large bonification; (2) Small bonification; (3) Human bonification.

(1) Large, integral bonification. According to official documents, the first law on the subject of bonification, that of Bacarrini in 1882, was concerned only with the drainage of swamps, without taking into account the provision and utilization of water. This was successful in some parts of Italy, but in others, which were subject to long periods of drought, the marshes provided the only pasturage during the summer, and could not be drained without damage to agriculture. In 1923, the National Government recognized this, and decreed that all hydraulic work should be conducted with the object of creating a healthy neighbourhood suitable for a resident population, which should not only be protected from water by drainage, but also assisted to make use of it in irrigation. In addition to irrigation, the new laws provide for roads, canals, and water supplies, electric power and the building of farm-houses and villages. The object of integral bonification is to make the country fit to support a healthy and contented resident agricultural population, and it embraces all the measures which assist in the accomplishment of this aim; such may be the straightening of a river, or the converting of a salt marsh into a fish pond. The *Chef du Gouvernement* has said "It is necessary to ruralize Italy, even if it costs thousands of millions, and tens of years work" and the government has provided for the integral bonification of 2,385,000 hectares of land at a cost of 7,500 million lira (£80,000,000).

(2) Small bonification: this is a part of large integral bonification. It consists of the abolition of stagnant water, cleaning up drains and putting them in order, and a campaign against mosquito breeding. Small bonification is limited to the neighbourhood of dwellings.

(3) Human bonification. By this is meant the intensive treatment of all infected persons in a given area, during the winter, with the object not only of preventing relapses but also of preventing the infection of anopheles at the beginning of the hot weather. Experiments made on farms and in isolated hamlets, free from invasion by infected mosquitoes, have given excellent results.

W. F.

CELLI (Anna). **The Cinema in the Campaign against Malaria.**—*Internat. Rev. Educational Cinematography*. Rome. 1930. May. Vol. 2. No. 5. pp. 618-623. With 1 text fig.

ICHOK (G.). L'action sanitaire à l'étranger. Le cinématographe contre le paludisme en Italie.—*Rev. d'Hyg. et de Méd. Préventive*. 1930. Nov. Vol. 52. No. 11. pp. 847-856. [1 ref.]

"The cinematograph has become the most efficacious and rapid of all the means of anti-malaria campaign in the Province of Rome." During the past three years, before the shepherds and peasants went down to the marsh-lands they were shown on the film the danger of fever, the means of avoiding it, and the way to treat it. The usual anti-malaria lectures were not understood by such people, nor did British and American cinema-shows meet with success, because the environment was foreign; the peasants are able to identify themselves only with educational films of local production. Malaria, like all biological phenomena, is subject to vast fluctuations of a more or less regular kind. It is generally supposed that the fall of the Western Empire was responsible for the abandonment of the Roman Campagna, but during the Renaissance the Campagna was again alive with villas and palaces

as in the days of Imperial splendour, and Ostia was a health resort. In later centuries malaria grew more and more destructive; Ostia was abandoned, Magliana shared the same fate, and Rome was only a healthy oasis in the midst of a pestiferous desert. During the past 25 years, enormous progress has been made in reclaiming the land from the evil, and Rome is now surrounded by gardens and villages. "Quinine was the primary cause of the success of hydraulic and agrarian effort, this is used on a big scale as a preventive measure against the disease, and, thanks to it, a new, healthy, and industrious, population is growing up to repopulate the country." (See J. G. THOMSON above, p. 123.)

W. F.

VAUCEL. La lutte contre le paludisme en Yougo-Slavie et en Italie. [**The Campaign against Malaria in Yugo-Slavia and Italy.**]—*Ann. de Méd. et de Pharm. Colon.* 1930. Jan.-Feb.-Mar. Vol. 28. No. 1. pp. 5-34.

Dr. Vaucel also accompanied the party to Yugoslavia and Italy. In Yugoslavia the anti-malaria campaign constitutes only one part of a vast programme of hygiene in course of execution. Funds are not available for large works and only quininization and the less costly anti-larval measures are carried out, under the supervision of the Institutes of Hygiene established at Belgrade, Skoplje and Trogir. In the plain of the Danube the floods of spring and autumn provide innumerable breeding places for *A. maculipennis*, and it is intended to reclaim the whole area subject to floods when funds are available. In Macedonia malaria is prevalent throughout the year; only January and February are relatively healthy. The splenic index is about 35 per cent., in some places as high as 100 per cent. The vectors are *A. maculipennis* and *A. superpictus*. The first is responsible for the benign tertian and about two-thirds of the subtertian malaria, the second is the vector of *P. falciparum* in the autumn. Almost all the breeding places around Skoplje are pools in the dried bed of the river Vardar, and in irrigation channels running through gardens. All breeding places are treated with Paris green every 8 days, and examined for larvae on the following day. Mass quinine prophylaxis is not in force, but all carriers of parasites are given 1 gram of quinine daily for seven days, and, after freedom from parasites has been determined, for 3 days more. The results of the campaign have been good, fourth stage larvae and nymphs are rarely found in the breeding places, and there are few mosquitoes in the cowsheds. The plasmodial index, which was 35 per cent. in 1923, was only 12 per cent. in 1929. A trial of the same methods on a large scale is being undertaken, with the assistance of the Rockefeller Foundation, in the region of Kriva Palanka, near the Bulgarian frontier. In Dalmatia, which is one of the most malarious countries in Europe, *A. maculipennis* is the vector in the north, and *A. elutus* is the vector in the south. In some of the barren rocky regions, pits, which collect the rain, supply the only water available for man and beast. Anopheles breed in these pits, or *lokvas*, and covered cisterns are being substituted. In the salt marshes, near the sea, gambusia, which have been acclimatized to salt water in the laboratory, are doing good service. Above all, Paris green is giving excellent results.

The following method is used in Italy as a test for Paris green in water. Several centimetres of the water are put into a tube containing a culture of *Penicillium brevicaulis* on potato. After 2 to 4 hours, a strong smell of garlic is given off. The reaction is positive in a dilution of 1 part in 1,000,000. The author's visit to Yugoslavia and Italy impressed on him the importance of minor anti-larval measures, which are gradually taking the place of quinine prophylaxis.

W. F.

DE BUEN (Sadi). Algunas consideraciones sobre la eficacia del tratamiento y de las medidas antilarvarias en la lucha antipalúdica. [**On the Value of Treatment and of Antilarval Measures in combating Malaria.**]—Reprinted from *Arch. Inst. Nac. de Hig. de Alfonso XIII.* 1929. May. Vol. 6. No. 6. 23 pp. With 6 graphs in text.

The author surveys the results of treatment on a large scale and of anti-larval measures in limited areas in their effects on malarial prevalence for varying periods between 1921 and 1927 in parts of Spain.

It is difficult to draw any general conclusions because in many instances the areas dealt with are very small, comprising under 50 inhabitants.

H. H. S.

SCHWETZ (J.), BAUMANN (H.) & CABU (F.). Sur la stérilisation des réservoirs d'hématozoaires paludéens par la quinine et le cinchona. [**The Sterilization of Reservoirs of Malarial Haematozoa by Quinine and Cinchona.**]—*Ann. Soc. Belge de Méd. Trop.* 1930. Mar. 31. Vol. 10. No. 1. pp. 95–102. [4 refs.] [Parasit. Lab., Stanleyville.]

Single daily doses of quinine, or of cinchona febrifuge, 4 to 8 grains, were given to school children at Stanleyville, where 100 per cent. are infected. It was evident that if one wished to obtain a radical cure and permanent prophylaxis, it would be necessary to continue the treatment indefinitely. The usual insurmountable difficulty of such methods was encountered, namely, the impracticability of making people take drugs regularly over a long period.

W. F.

D'HOOGE (M.). L'action de la prophylaxie quinique chez les travailleurs Ruanda-Urundi à Ruashi. [**The Effect of Prophylactic Quinine on the Ruanda-Urundi Labourers at Ruashi.**]—*Bull. Méd. du Katanga.* 1930. Vol. 7. No. 2. pp. 42–43.

A dose of 1 gram of quinine three times a week was given to the labourers, and this brought about a considerable reduction in the number of cases admitted to hospital. The recruits, who were all infected before their arrival, were given half a gram every day, which was sufficient to maintain a state of equilibrium between them and their parasites.

W. F.

D'ANFREVILLE DE LA SALLE. Un procédé récent de lutte antipaludéenne. [**A New Move in the Antimalarial Campaign.**]—*Rev. Méd. et Hyg. Trop.* 1930. July–Aug. Vol. 22. No. 4. pp. 193–196.

The anopheles of Morocco breed in shallow stagnant water. A small, indigenous fish—*Cyprinodon fasciatus*—is actively larvivorous, but has the disadvantage of growing to such a size that the natives catch it for food.

Excellent results have been obtained in an experimental trial of imported *Gambusia holbrocki* which do not grow longer than a couple of inches. (See this *Bulletin*, Vol. 27, p. 641.)

W. F.

JACKSON (R. B.). **Malaria and Mosquito Curtains in Certain Areas of Pahang West.**—*Malayan Med. Jl.* 1930. June. Vol. 5. No. 2. pp. 67–68.

Forty-seven children were examined in four villages occupied by Chinese, in which no anti-malarial operations had been undertaken. The spleen-rate was only 1·7 per cent., and enquiries showed that the villagers suffered very slightly from malaria, although *A. maculatus* was found breeding in the vicinity. By way of contrast, the spleen rate of 1,193 Malay children, in schools and villages, was 45; and the spleen rate of 155 Tamil children was 79. Dr. Jackson attributes the difference in the incidence of malaria to the use of the mosquito net by the Chinese [but one cannot help suspecting that some additional factor was concerned].

W. F.

KNOWLES (R.) & GUPTA (B. M. Das). **Studies in Untreated Malaria. I. A Case of Experimentally Induced Quartan Malaria.**—*Indian Med. Gaz.* 1930. June. Vol. 65. No. 6. pp. 301–310. With 2 charts & 1 text fig. [18 refs.]

An Indian who was suffering from neurosyphilis was inoculated therapeutically with quartan malaria which caused what was almost certainly a primary infection. The attack was more severe than the natural disease; on one occasion there were 43,600 parasites per cmm.; in general, the number fluctuated between 6,000 and 10,000. In chronic relapsing cases the number is much lower than this. Gametocytes appeared at the very commencement of the fever; they constituted about 6·2 per cent. of the parasites; they appeared to live about 6 days, and they were rapidly destroyed by quinine. In the schizogony cycle, the free merozoite stage lasted about 1 hour; the ring stage 17 hours; the growing trophozoite stage 47 hours; schizogony 6 hours; mature rosettes 1 hour. The number of merozoites in each rosette was about 8. Some 95 per cent. of the merozoites failed to enter erythrocytes, and were apparently destroyed during each cycle; this the authors believe to be due to the action of lysins in the plasma, for they were unable to find evidence of phagocytosis of the merozoites by the polymorphonuclear leucocytes, such as they have observed in cultures. The fever of invasion, in this case of primary quartan malaria, was irregular, as it is in primary benign tertian; later on, typical quartan periodicity was established. Daily parasite counts were made by Sinton's fowl-corpuscle method. The formalinized suspension kept in perfect condition, in the ice-chest, for nine months. The films were fixed in methyl alcohol, pH. 6·8; washed in distilled water; stained for 20 minutes in Giemsa, 1 drop to 1 cc. of distilled water; washed with distilled water; dried in air. The distilled water was adjusted to pH 7·2 with decinormal soda.

W. F.

ANDERSON (G. V. W.). **Clinical Aspects of Malaria in Kenya.**—*Kenya & East African Med. Jl.* 1930. July. Vol. 7. No. 4. pp. 88–99.

The error of diagnosing appendicitis when the abdominal pain is due to malaria only, can be avoided if it is remembered that peritonitis is accompanied by a tender, rigid, abdomen which cannot be relaxed. The abdominal pain which occurs in some cases of malaria is situated in one of two places: (1) Under the left costal margin; sometimes accompanied by tenderness in the upper part, where it coincides with a palpable spleen. (2) Along the right costal margin, often extending across the epigastrium. The pain in this area may be acute in blackwater fever. The tenderness, if there is any, is always over the liver; it never extends to the iliac fossa. These are the only kinds of abdominal pain which the author has seen in uncomplicated malaria. Their character and position in no way represent appendicitis or renal colic.

Attention is drawn to the insidious onset of cerebral malaria. It frequently begins as a confusional condition; the patient is not sufficiently alert to realize that he is seriously ill, or to remember to take his quinine, and his mental state often misleads his doctor to diagnose alcoholism or insanity until, 48 hours later, fatal coma occurs.

W. F.

GESTEIRA (Martagão). Le paludisme chez l'enfant. (Quelques réflexions touchant le problème thérapeutique.) [**Malaria in Children.**]—*Rev. Sud-Américaine Méd. et Chirurg.* Paris. 1930. Sept. Vol. 1. No. 9. pp. 923–933.

Dr. Gesteira considers that the dose of 10 centigrams of quinine for each year of a child's age is too small; a dose of 10 centigrams ($1\frac{1}{2}$ grains) will not cure a child of one year. Most of the cases of so-called quinine resistance in children he ascribes to the pusillanimity of the doctors. On the other hand, in children, there is but a narrow margin between the therapeutic dose and the toxic dose; there is an added danger in infants, because they cannot complain of the early toxic symptoms such as tinnitus. He tells some terrible stories of infants poisoned with overdoses of quinine, of abscesses in the buttocks, of convulsions, of parents attempting suicide because their children had been blinded by quinine. The technique of injection into the jugular vein is simple enough in infants, but he has abandoned the intravenous method because he has seen it followed by sudden death. Intramuscular injections are too often followed by abscess, no matter what precautions are taken. He has found SUZUKI's method of rectal administration of quinine, in 0.25 to 0.5 per cent. solution, very satisfactory in the three cases in which he has tried it.

W. F.

DE LUCA (Benedetto). L'emiplegia infantile da malaria. [**Malarial Hemiplegia in Infants.**]—*Policlínico.* Sez. Prat. 1930. Aug. 11. Vol. 37. No. 32. pp. 1171–1175. [13 refs.]

The author refers to ASCOLI who states that hemiplegia in malarial patients is common, but he maintains that if a distinction is made, as it should be, between hemiplegia in malarial subjects and hemiplegia due

to malaria, the latter is very rare. He records details of two cases very similar except that in one *P. vivax* was present, in the other *P. falciparum*. The former only need be given here :

A child of 3 years had suffered from malaria with several relapses from the age of 7 months. Subsequently they recurred and the day after admission to hospital the child had general convulsions during an attack (*P. vivax* was present in large numbers in the blood) more marked on the right side. The following day examination revealed complete right hemiplegia. Quinine was given by injection and by mouth. The paralysis remained unchanged for 20 days and then began to improve, and when the child left hospital 5½ weeks after admission there were no residual indications of the attack. The cerebrospinal fluid was normal and this fact together with the complete recovery put out of court the idea of any of the usual organic causes of the hemiplegia, such as cerebral haemorrhage or encephalitis.

H. H. S.

TRABAUD (J.). La malaria, maladie convulsivante. [**Epileptiform Malaria.**]—*Bull. Acad. Méd.* 1930. May 27. 3rd Ser. Vol. 103. No. 21. pp. 575-578. [1 ref.]

Malaria resembles epilepsy in many ways : sometimes the first symptom of malaria is a fit, and fits are not at all uncommon in severe forms of the disease. More important than these convulsive attacks are the malarial psychoses, which resemble the psychoses of *petit mal*. For example, a sergeant-major of exemplary character contracted malaria in Damascus, and subsequently became insubordinate. On one occasion, he left his duty and went into the bazaar ; on another, he wandered off with his rifle, and lost it. A second N.C.O. who was suffering from chronic malaria boarded a motor car while he was in a state of automatism, and did not come to himself until he got to Beirut, where he was laid up for five days with an attack of malaria. The malarial psychoses resemble alcoholism very closely, but neither of these men drank much, and similar cases occurred among strict Mahomedans who drank no alcohol. Many men have suffered unjust punishment on this account, and the main object of this paper is to draw attention to the medico-legal importance of recognizing that impulsive automatic psychoses occur in malaria as they do in epilepsy.*

W. F.

GIGLIOLI (George). **Malarial Nephritis. Etiological, Epidemiological and Clinical Studies on Bright's Disease in British Guiana, 1922-1929.**—*British Guiana. Rep. of the Surgeon General for the Year 1929.* Appendix II. pp. 71-86. [18 refs.]

In this appendix to the Surgeon-General's annual report, Dr. Giglioli gives a short synoptic outline of his observations on Bright's disease, as published in the monograph entitled "Malarial Nephritis" which was reviewed in this *Bulletin* (Vol. 27, p. 508). Chronic nephritis, a condition for which British Guiana is notorious, occurs where and when chronic untreated quartan or benign tertian malaria prevail and persist. *P. malariae* is, in the main, responsible. There is absolutely no proof

* See also Anderson's *Malarial Psychoses and Neuroses* (1927), Oxf. Univ. Press, reviewed in this *Bulletin*, Vol. 24, p. 683.

that streptococcal infections or dietary deficiencies play any part in the causation of the disease. Albuminuria is rarely noted in treated cases of malaria, even if the treatment consists of quinine taken irregularly and at long intervals; long continued, unchecked fever is the cause. "During the last two years much has been said in the Colony about too much being spent on cure and too little on prevention, and measures are being taken to intensify on the latter, at the expense of the former." The author does not agree with this policy; he considers that mosquito control would be quite ineffective in the rural areas; he argues that, in malaria, treatment is a powerful means of prevention, and that systematic, competently-administered treatment is the only practical measure which can be undertaken in the present economical and educational stage of British Guiana. "By yielding immediate palpable results, it would moreover contribute to inspire new confidence in the people towards Public Health work, which many years of futile anti-mosquito campaigns have deeply shaken."

W. F.

WOLSKY (M.) & SCHEWELEWA (E. M.). Zur Frage der Nierentätigkeit bei Malaria. [**Renal Activity in Malaria.**]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1930. Oct. Vol. 34. No. 1J. pp. 542-549. [21 refs.] [Malaria Station and Hospital, Samara-Slatoust Railway.]

In 76 cases of malaria investigated 50 showed various alterations in the functional activity of the kidneys. The following shows the relation to the malarial infection :—

15 cases of damage to renal function occurred in 23 cases of benign tertian.

6 cases of damage to renal function occurred in 10 cases of malignant tertian.

13 cases of damage to renal function occurred in 19 cases of quartan.

The authors conclude that probably in malarial areas cases of renal disease of uncertain etiology are often a result of chronic malarial infection; this may be the immediate and only cause, whilst in other cases it renders the kidneys more susceptible to infections, irritations, etc. [GIGLIOLI in British Guiana records that chronic nephritis is found exclusively associated with the benign forms of malaria which are notorious for their greater tendency to chronicity and recurrence and it appears to be specifically related to *P. malariae* infection.]

E. D. W. Greig.

LORANDO (N. I.). Néphrite et dégénérescence amyloïde d'origine palustre. [**Nephritis and Amyloid Degeneration of Malarial Origin.**]—*Bull. Soc. Path. Exot.* 1930. June 11. Vol. 23. No. 6. pp. 584-589.

A boy of nine who was under treatment for chronic subtertian malaria had a large quantity of albumen in his urine with a high concentration of urea in his blood, and he suffered from repeated attacks of coma. Post mortem, the kidneys were small and granular, the tubules were atrophied, and the glomerulae had undergone hyaline degeneration. The connective tissue was hypertrophied and infiltrated with leucocytes. The glomerulae and the small arteriols gave a positive amyloid reaction with gentian violet. Amyloid degeneration was also present in the liver and the spleen.

W. F.

EYERMANN (Charles H.) & STRAUSS (Arthur E.). **Malarial Urticaria and Allergy.**—*Jl. Allergy*. 1930. Jan. Vol. 1. No. 2. pp. 130-135. With 1 chart. [30 refs.] [Med. School, Washington Univ., & Jewish Hosp., St. Louis, Mo.]

A woman was taken ill suddenly with epigastric pain and vomiting which was relieved by morphia, but recurred on the following day. On the third morning, she had another attack accompanied by a rise of temperature and urticaria. No malaria parasites were found. Similar attacks with urticaria occurred on the fourth, fifth, and sixth days. On the seventh day, she had a chill with the urticaria, and, on the eighth, an enlarged spleen and a mixed tertian infection were discovered. All the symptoms disappeared when quinine was given. It is suggested that the urticaria was an allergic phenomenon due to infestation with malaria parasites, and analogous to the allergy which develops in hydatid disease. (See also FERRAO, P., Vol. 27, p. 206.)

W. F.

CRASTE. Un cas autochtone de paludisme à *Plasmodium vivax*. [**An Indigenous Case of Benign Tertian.**]—*Bull. Soc. Path. Exot.* 1930. July 9. Vol. 23. No. 7. pp. 726-727. [Civil Hosp., Bayonne.]

A nun who had lived for many years in a convent near Cambo, in the region of Bayonne, developed benign tertian malaria, with very high fever. She had never been abroad, but *A. maculipennis* breeds in the neighbourhood, and probably carried the infection from an old soldier who lived near the convent. The patient became very ill before malaria was diagnosed, and the case is reported as a warning to medical men in the neighbourhood.

W. F.

MICHELETTI (Ettore). Il contenuto parassitario degli organi nelle forme malariche perniciose. [**The Parasite Content of Organs in Subtertian Malaria.**]—*Ann. di Med. Nav. e Colon.* 1930. July-Aug. Year 36. Vol. 2. No. 1/2. pp. 365-395. With 8 figs. on 4 plates. [9 refs.] English summary. [Inst. of Path. Anat., Univ., Rome.]

The author made careful autopsies on five patients dying from subtertian malaria and submitted to histological examination portions of the spleen, liver, kidney, heart, brain, cerebellum and skin. In each of these he observed the arteries, capillaries and veins to determine the parasite content, the results of phagocytosis or destruction of the plasmodium in the vascular endothelium, and the local damage, if any, caused by the parasite or its residues. All five showed almost the same conditions, the differences being of degree only, not qualitative, so that the findings can be summarized. It is common to hear the statement "there was an accumulation of parasites in the spleen," but to the author's surprise the number of actually parasitized red cells in the spleen was small; the remnants of cells and damaged fragments were many, and he concludes that the spleen (and the findings in the liver were similar) is not the depôt of parasitized corpuscles, but acts rather as a filter retaining damaged corpuscles and remains of parasites which themselves set up inflammatory reaction in the spleen itself (and liver). In the bone marrow (rib and femur) there was a greater accumulation than in liver or spleen, but in some the gametes were many, the trophozoites few. In the brain and cerebellum the parasites did appear to accumulate in the capillaries, sometimes but not invariably causing damage to the nerve cells and neuroglia. As regards the heart, the

veins of moderate calibre contained many parasites, but injury to the capillary endothelium was not seen; he infers, therefore, that the heart is merely a means of passing on the parasites through the capillaries to the veins and general circulation. The kidneys showed a cumulation of parasites in the glomeruli, pigmentation of the capillary endothelium, and in many sections the tubular epithelium showed necrosis and granular degeneration; that is, the kidneys are organs where the parasites accumulate and cause injury to the surrounding cells (capillaries and tubules), but also act in part as "organs of passage."

H. H. S.

KENYA AND EAST AFRICAN MEDICAL JOURNAL. 1930. Sept. Vol. 7. No. 6. pp. 161-175. **The Treatment of Malaria.** [GILKS, BURKITT, and others.]

The doctors of Kenya are not unanimous as to the way in which quinine should be given, and this discussion on treatment reveals a wide divergence of opinion. Dr. Gilks, who opened the debate, recommended intramuscular injections as the routine treatment for adults, because, whatever the type of case, he considered that there was no guarantee that the quinine would be absorbed. [It is a very simple matter to test the urine by adding a few drops of Mayer's reagent.] Dr. Burkitt, who followed Dr. Gilks, said that he never used intramuscular injections unless he was forced to do so, and that, in his opinion, it was a very bad practice.

W. F.

BASS (C. C.). **The Treatment of Malaria, with Some Reference to recently promoted New Remedies.**—*Jl. Amer. Med. Assoc.* 1930. Oct. 4. Vol. 95. No. 14. pp. 988-991. [12 refs.] [Med. School, Tulane Univ., New Orleans.]

The author considers that the cinchona alkaloids, especially quinine, constitute the only specific remedy for malaria. Arsphenamine, stovarsol, and other arsenical preparations, have some non-specific effect, but they are so far inferior to quinine that their use is on the decline.

"The use of these preparations as remedies for malaria seems to be more closely related to the appeal for intravenous therapy than to the cure of malaria . . . any fluid, even salt solution, given directly into the blood stream damages the blood cells to some extent and tends to make them an unfavourable soil for malaria parasites to grow in. [See MASSIAS below.] . . . Plasmochin has far less effect on malaria than has quinine, and its toxicity, which is associated with methaemoglobinaemia, makes its routine use questionable. . . . I am sure that malaria can be cured with plasmochin as with many other things, but the question would naturally arise at the present time as to whether the price paid is worth the results." [? whether the results are worth the price paid.]

In spite of the well-attested evidence in proof of the gametocidal power of plasmoquine, Dr. Bass appears to doubt it; he suggests that many of the statements and claims to this effect are not based on controlled observations, but are simply repetitions of similar claim made by others. He also considers that further confirmation of the specific action of plasmoquine on the reproductive power of gametes is required. (See United Fruit Company's Report, this *Bulletin* above, p. 106, and BARBER and others, Vol. 26, 1929, p. 939.)

W. F.

HOANG-SU. La quinine en injection intraveineuse dans le traitement du paludisme. [**Intravenous Quinine in the Treatment of Malaria.**]—*Bull. Soc. Méd.-Chirurg. Indochine.* 1929. Dec. Vol. 7. No. 12. pp. 684-687.

The author treated 1,086 cases of malaria with intravenous quinine at Phu-diên, in Indo-China. He gave 4,343 injections in five weeks, amounting, in all, to 29 litres of a 1/20 solution of quinine. There were no serious after-effects. The patients experienced a sensation of heat, tinnitus and giddiness immediately after the injections, but these symptoms soon passed off except in a few debilitated people who were obliged to lie down for the remainder of the day. The routine treatment was 1 gram of quinine by the mouth, and 0.25 centigrams intravenously, every day for four days; in robust individuals, double the quantity of intravenous quinine was given. It was put up in ampoules with the following prescription:—

Quinine	0.25 cgm.
Arrhenal	0.05 cgm.
Sérum physiologique	5 cc.

In robust patients, ampoules were used which contained double this quantity of quinine. [In the average case of malaria, when oral quinine is absorbed, it does not appear necessary, or right, to inject it intravenously.]

W. F.

MASSIAS (Charles). Le quiniostovarsol dans le traitement du paludisme à *Plasmodium vivax* et *Plasmodium praecox*. [**Quiniostovarsol in the Treatment of Malaria.**]—*Bull. Soc. Path. Exot.* 1930. June 11. Vol. 23. No. 6. pp. 651-663. With 17 text figs. [10 refs.]

This drug is of great value in chronic malaria with anaemia. The quinine destroys parasites, while the arsenic rapidly improves the general condition of the patient. It does not prevent relapses. The dose for an adult is 1 gram daily for 10 days, and ten-day courses are repeated over a period of 2 months, with intervals of 7 days, or more, between them. Doses of 0.5 gram can be given to children between 5 and 10 years old. (See C. C. BASS above.)

W. F.

WALLACE (R. B.). **The Use of Plasmochin Compound and Quinine with Indian Labour under Estate Conditions in Malaya.**—*Malayan Med. J.* 1930. Mar. Vol. 5. No. 1. pp. 11-25. With 2 figs. & 5 charts. [3 refs.]

These experiments were carried out on a malarious rubber estate where the elimination of all breeding places within range of flight of the dangerous mosquito (*A. maculatus*) was impracticable on account of the numerous hills and ravines, and the rocky nature of the country. Mosquito larvae were carried down the streams from the hills for long distances, and "to deal with this source of infection would necessitate oiling of the whole length of the streams—a distance of several miles." The daily adult dose employed in treatment during the first week was 5 tablets of Plasmoquine Co. in the morning, and, in the evening, 2

tablets along with 10 grains of quinine. Each tablet contained 0.01 grams of plasmoquine and 0.125 grams of quinine. The patients were thus given about 23 grains of quinine daily in addition to 0.07 grams of plasmoquine. During the second week, the dose of plasmoquine compound was reduced to 4 tablets daily. During the third, fourth, and fifth weeks, the treatment was given on three days in each week instead of every day. The result was a fall in the sick rate and the parasite rate, accompanied by definite improvement in the health of the coolies as demonstrated by a rise in the haemoglobin rate and a better daily out-turn of labour. The sections of the estate where treatment was being carried out remained healthy, while other sections were suffering from an epidemic of malaria. No serious toxic effects were observed and plasmoquine compound was subsequently used as part of the regular field treatment without special medical supervision. The cost was considerably higher than treatment with quinine alone, but the extra expense was justified by the result. [Much smaller doses of plasmoquine have been found useful on the United Fruit Company's plantations. See DEEKS above, p. 108.]

W. F.

CIUCA (M.), IRIMESCO (G.), BALLIF (Léon), FRANKE (M.), CONSTANTINESCO (N.) & VIERU (M.). Recherches sur l'action thérapeutique de la plasmochin pure dans le paludisme. [**Experiments with Plasmochin sine Quinine.**]—*Arch. Roumaines Path. Expér. et Microbiol.* Paris. 1930. Mar. Vol. 3. No. 1. pp. 85-94. [Izolarea Hosp., Milit. Hosp., & Socola Hosp., Jassy.]

One hundred and nine natural, and six experimental, infections were treated in hospital with doses of plasmoquine not exceeding 0.06 to 0.08 grams daily. Toxic symptoms necessitated the suspension of treatment in 60 per cent. Doses as small as 0.02 were sometimes toxic, even when given with quinine. Relapses were frequent. The authors conclude that plasmoquine cannot take the place of quinine, that it should never be given without quinine, and that its administration should always be under direct medical supervision.

W. F.

LEISERMANN (L. I.). Ueber die parasitizide Wirkung des Plasmochins. [**Parasitocidal Action of Plasmochin.**]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1930. June. Vol. 34. No. 6. pp. 309-319.

The blood was examined in 20 cases of malaria, both malignant and benign tertian, in order to observe the action of plasmochin on the various phases of the parasites of malaria. In benign tertian infection it was found that the schizonts were the most resistant to the action of plasmochin. In malignant tertian infection the rings disappeared towards the middle of the second day, but the gametocytes were observed for three to four days after commencing plasmochin; as the schizonts were never seen in this infection it was not possible to say what happened to them. Pure plasmochin and plasmochin compound were administered. [The quantity of plasmochin given is not stated. Quinine as well as plasmochin is contained in plasmochin compound.] From these observations the author is convinced of the specific parasitocidal action of plasmochin.

E. D. W. Greig.

MYNSEN (G. E. H. Verspyck). Behandlung von Malaria tropica mit Chinin in Kombination mit Plasmochin. [**Quinine and Plasmochin Treatment of Malignant Malaria.**]—*Acta Leidensia (Scholae Med. Tropicae)*. 1929. Vol. 4. pp. 196–212.

From August 1927 to August 1928, 66 patients suffering chronic malaria—54 malignant, 12 benign tertians—were treated in the Tropical Diseases Hospital at Rotterdam. The author concludes that in cases showing crescents in the blood, plasmochin, in combination with fairly strong doses of quinine, is a powerful gametocidal agent. [The proof correcting of this paper is indifferent; thus it is stated, "I never gave more than 40 g. Plasmochin per day," and the "number of leucocytes sank to 1600000."]

E. D. W. Greig.

BORCHARDT (W.) Ueber die chemo-therapeutische Wirkung von Chinin, bzw. Plasmochin in vitro auf *Proteosoma praecox* (Vogelmalaria). [**Action in vitro of Quinine and Plasmochin on *Proteosoma praecox* (Bird Malaria).**]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1930. July. Vol. 34. No. 7. pp. 360–364. [6 refs.]

The *in vitro* experiments showed that the minimum doses and the minimum time interval required to kill the parasites were: 0.5 mgm. quinine hydrochlor. per 1 c.c. infected blood, 4 mgm. quinine bihydrochlor. and 0.2 mgm. plasmochin, after 5 hours in the ice chest. These results suggest a direct attack by the drug on the parasites of bird malaria. The author considers that the action of quinine and plasmochin on the parasites of human malaria should be studied in a similar manner.

E. D. W. Greig.

PHILAIRE. Contribution à l'étude de l'action thérapeutique du bleu de méthylène dans le paludisme. [**The Action of Methylene Blue in Malaria.**]—*Ann. de Méd. et de Pharm. Colon.* 1930. Jan.–Feb.–Mar. Vol. 28. No. 1. pp. 48–54.

The author recommends the administration of methylene blue in cases where quinine fails to act, in cases of oligocythaemia with fragility of the corpuscles, and in pernicious attacks. No mention is made of any blood examinations to control its effects on the malaria parasites. Intramuscular injections of 2 cc. of a 2.5 per cent. solution were given daily, in association with quinine. In pernicious attacks an intravenous injection of 5 cc. was given at once.

Administration by the mouth was abandoned because it caused severe vomiting, violent diarrhoea and vertigo. Special precautions were taken in cases of nephritis and severe cachexia.

W. F.

CHOPRA (R. N.) & KNOWLES (R.). **The Action of Opium and Narcotine in Malaria.**—*Indian J. Med. Res.* 1930. July. Vol. 18. No. 1. pp. 5–13. [2 refs.] [School of Trop. Med. & Hyg., Calcutta.]

In the report of the Opium Commission of 1895, it was stated that the habit of taking opium formerly prevailed in excess in the low-lying marshy districts of England, where its consumption was very large in the days when malaria was prevalent. It was implied in the report that the drug had an anti-malarial action. The authors found that opium had neither a prophylactic nor a curative effect.

Narcotine is a bitter crystalline alkaloid; in some Indian opiums the amount of narcotine is double that of morphia. Several reports were

issued, in the past, stating that it was a cure for malaria, and it was regularly supplied from Government factories until 15 or 20 years ago when quinine became cheaper. The authors tried its effects on several cases of malaria (tertian, subtertian and quartan infections), and came to the conclusion that, even in doses of 10 to 15 grains daily, it had no effect on the parasites or the fever.

W. F.

GUELIADOW (N. B.). [Application of Calcium Treatment in the Therapy of Malaria.]—*Trop. Medicine & Veterinary*. 1930. Vol. 8. No. 3. pp. 7-11. [In Russian.]

The author has applied calcium treatment in at least twenty-nine cases of malaria in which quinine produced various complications. In all these cases and in those of quinine-idiosyncrasy the after-effects of the drug were successfully eliminated. Particulars of treatment are not given, but it is said that on the appearance of symptoms due to quinine it is unnecessary to discontinue the use of the drug if oral administration of 10-20 per cent. calcium chloride in doses of one table-spoonful 3-4 times a day after meals is resorted to.

C. A. Hoare.

VAN DEN BRANDEN (F.). Le produit de broyage des graines de *Picralima Klaineana* (Pierre) dans le traitement du paludisme. [The Powdered Seeds of *Picralima Klaineana* in the Treatment of Malaria.]—*Ann. Soc. Belge de Méd. Trop.* 1930. June 30. Vol. 10. No. 2. pp. 123-128. [4 refs.] [Leopoldville Lab., & School of Trop. Med., Brussels.]

It has been stated that the seeds of this plant are a remedy for malaria. As much as 2.5 to 4 grams were given to five children without curing the subtertian malaria from which they were suffering. Four boys, 12 to 17 years of age, were given 3 or 4 grams a day, but totals of 22, 21, 19 and 17 grams, respectively, had no action on their subtertian infections. There were no toxic symptoms. The author considers that further trials should be made with larger doses of the powder, and also with an alcoholic extract.

W. F.

HASLÉ (G.) & NGUYEN-DUY-HA. Traitement des splénomégaties chroniques paludéennes par le sérum Normet médical. [The Treatment of Chronic Malarial Splenomegaly with Normet's Serum.]—*Bull. Soc. Méd.-Chirurg. Indochine*. 1930. Apr. Vol. 8. No. 4. pp. 308-313. With 4 figs.

Two patients with enormous spleens were treated by injections of 10 cc. of Normet's serum, with intervals of 10 days between the doses. After some three months treatment, the splenomegaly had almost disappeared, and, in one case, there was an improvement in the number of red cells and in the percentage of haemoglobin.

W. F.

TWITCHELL (Edward W.). Spontaneous Rupture of Spleen—following Malaria Therapy for General Paresis.—*California & Western Med.* 1930. July. Vol. 33. No. 1. p. 512.

A patient with general paralysis, "in a stage of rather marked mental dilapidation," was treated by the inoculation method. After 18 paroxysms of fever, he was given 10 grains of quinine. Shortly afterwards he vomited and collapsed. His abdomen became distended and filled with blood, and he died on the third day. A tear, 18 cm. long, was found in his spleen.

There were numerous gas spaces in the organ, and a Gram-positive bacillus (*Cl. welchii*), but no malaria parasites were seen.

W. F.

SPEIERER (Carl). Rezidivierende Impfmalaria und deren Behandlung. [Relapsing Inoculation Malaria and its Treatment.]—*Dermat. Woch.* 1930. July 5. Vol. 91. No. 27. pp. 980–983. [8 refs.] [Dermat Clinic & Polyclinic, Univ., Munich.]

Two cases of inoculation malaria are described in which relapses took place. The relapses were not controlled by active quinine treatment. Accordingly the author adopted a combination of three methods of treatment which had proved successful in cases of relapse in natural malaria. The methods were: (1) Exposure of the whole body to sun's rays followed by administration of quinine. (2) The application of X-rays over the spleen with or without subsequent quinine administration. (3) Combined administration of Sod. cacodyl, strychnine and quinine. The author's scheme of treatment combines the 3 methods and extends over a period of 8 days. No further relapses occurred after the treatment.

E. D. W. Greig.

HENRY (A. F. X.). Sérofloculation palustre. Methodes photométriques. [Seroflocculation in Malaria. Photometric Methods.]—*Arch. Inst. Prophylactique.* Paris. 1929. Vol. 1. No. 4. pp. 341–350.

The author ascribes the histo-pathological lesions of malaria to the accumulation of two kinds of pigment derived from haemoglobin, namely the ochre-coloured ferruginous pigment and the melanin pigment. Considering it probable that these pigments would produce anti-bodies in the blood which might be of diagnostic importance in a flocculation serum test for malaria, he set out to search for substances which could be employed as antigens, in place of the malarial pigments which it was impracticable to obtain in a sufficient quantity. Accordingly he devised his seroflocculation and melano-flocculation tests, which have already been described in this *Bulletin* (Vol. 26, pp. 940–942; Vol. 27, pp. 211–212).

He first tried a number of methylarsenates of iron as substitutes for the yellow pigment, but only one of them, a product made by Bouty under the name of Metharfer, gave satisfactory results. Subsequently, he found that the *Ferrum Albuminatum in lamellis*, prepared by Merck, was also useful. In some cases one salt, in some the other, gave the greater flocculation. As a substitute for the black pigment, he used a suspension of choroidal pigment; details of its preparation were given in Vol. 26 of this *Bulletin*, p. 941. Dr. Henry strongly advises the use of a Vernes-Bricq-Yvon photometer in reading the flocculation reactions. A photograph of this instrument is given on page 281 of the first volume of the *Archives de l'Institut Prophylactique*.

W. F.

POZZI (Arnaldo). La reazione di Henry nella malaria. [The Henry Reaction in Malaria.]—*Policlinico.* Sez. Med. 1930. Aug. 1. Vol. 37. No. 8. pp. 361–375. [13 refs.] [Inst. of Clin. Med., Univ., Rome.]

The reaction, both the melano- and the ferro-flocculation, was tried in 115 malarial patients and 25 controls suffering from various diseases such as cirrhosis of liver, gout, tabes, pleurisy. Of 15 cases of chronic malaria with splenomegaly, two only showing parasite in the blood,

both reactions were positive in all. Eighty cases of relapsing malaria with parasites were tested either during an apyrexial interval, during the fever, or between attacks. Forty-one of the first, 3 of the second and 9 of the third gave a positive with both forms of the test; 1, 23 and 1 respectively gave a negative to both; one in the apyrexial and one during the fever gave a positive melanoflocculation and negative ferroflocculation; none gave the reverse of these. This is interpreted as 95 per cent. positive during an apyrexial period, 1.85 per cent. between attacks, and negative during the fever in 85 per cent. In a third group of 20 patients with a first attack, six were positive to both reactions in the apyrexial period, 2 in the interval between attacks and 1 only in the fever; 5 in the apyrexial period reacted to the melanoflocculation, but not to the iron. Among these again none gave a positive ferro- and negative melanoflocculation. The latter is therefore the more sensitive.

H. H. S

VIALATTE (Ch.) & REMONTET (E.). Paludisme viscéral, prémunition et réactions de flocculation d'Henry. [**Visceral Malaria, Pre-munition and Henry's Flocculation Reactions.**—*Bull. Soc. Path. Exot.* 1930. June 11. Vol. 23. No. 6. pp. 590-594. [7 refs.]

Eleven north Africans who had been admitted to hospital for various reasons were examined by Henry's tests, with the result that eight were found positive. They had neither parasites in the blood nor fever, but their spleens were enlarged 2 to 4 finger-breadths. A hundred Senegalese soldiers, natives of west and central Africa, were also examined. They showed no signs of malaria, but they had undergone repeated infection as children. Sixty-seven of them gave positive reactions. As a control 48 young French soldiers were examined. They had been in Africa only a short time and none were known to have suffered from malaria. Only 3 gave positive results, and these had possibly had attacks of malaria masked by prophylactic quinine. It is evident that the reaction persists long after the disappearance of the malaria parasites and all other signs of malaria.

W. F.

LE BOURDELLES (A. C. B.) & HENRY (A. F. X.). A propos de la séro-flocculation du paludisme. [**Sero-Flocculation in Malaria.**—*Arch. Méd. et Pharm. Milit.* 1930. July. Vol. 93. No. 1. pp. 121-124.

In this note, Dr. Henry points out a mistake in some tables of malaria-flocculations published by him in the *Paris Medical* of June 23rd, 1928 (this *Bulletin*, 1929, Vol. 26, p. 383), where it was stated that 7 out of 69 syphilitic sera gave a positive reaction. This was a misprint; neither syphilis nor haemo-cytoclastic diseases give positive reactions if the proper technique is followed. (See this *Bulletin*, Vol. 27, p. 211).

W. F.

RAYBAUD (A.). Le séro-diagnostic du paludisme : les réactions d'Henry. [**The Serodiagnosis of Paludism : Henry's Reactions.**—*Marseille-Méd.* 1930. June 5. Vol. 67. No. 16. pp. 725-731.

This is a clear and concise account of Henry's reactions with a summary of the results obtained by different investigators.

W. F.

CHEREFEDDIN (Osman). Wassermannsche Reaktion bei Malaria. [**Wassermann Reaction in Malaria.**]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1930. May. Vol. 34. No. 5. pp. 282-285.

The Wassermann reaction was tested in 76 cases of malaria in Turkey, and was found definitely positive in 10, 13.2 per cent. All three species of malarial parasite were represented among the positives. Antimalarial treatment produced a negative reaction in the course of one to two weeks.

E. D. W. Greig.

SINGH (Jamiat). **Urobilinuria and its Importance in Malaria.**—*Indian Med. Gaz.* 1930. July. Vol. 65. No. 7. pp. 390-391.

The presence of urobilin in the urine is, in the tropics, generally due to malaria. Examination for it is particularly useful in cases of malaria where quinine has been given and parasites cannot be found. It is present during the attack and for 3 or 4 days after the fever. The following tests are recommended.

(1) Add 5 drops of a 3 per cent. solution of paradimethylaminoazobenzaldehyde, in 50 per cent. hydrochloric acid, to 5 cc. of urine. A red colour shows that urobilin is present in abnormal amount.

(2) To 5 cc. of urine add 2 drops of Lugol's solution (Iodine 5; pot. iod. 10; water 100), and 5 cc. of a saturated solution of zinc acetate in absolute alcohol. Filter. A green fluorescence indicates urobilin.

(3) Acidify the urine with hydrochloric acid, extract with amyl alcohol. Examine with the spectroscope. A band in the green indicates urobilin. (See this *Bulletin*, 1928, Vol. 25, p. 146. MORISHITA and others.)

W. F.

PINELLI (Luigi). Resistenza globulare nelle epatosplenomegalie di origine malarica. (**Erythrocyte Resistance in the Hepato-Splenomegalies of Malarial Origin.**)—*Riv. di Malariaologia.* 1930. Jan.-Feb. Vol. 9. No. 1. pp. 40-52. With 1 chart. [39 refs.] [English summary (7 lines) p. 95.] [Inst. of Path. & Clin. Med., Univ., Sassari.]

The study of the resistance of red corpuscles to haemolysis in malaria is not new, but records are far from numerous. The occurrence of a large number of cases in Sardinia afforded an opportunity for more intensive investigation. For dilution the author did not use the customary oxalate of sodium or potassium in sodium citrate because he found that this tends to bind the calcium more firmly and increase the fragility of the corpuscles; he used instead isotonic saline. He examined the blood of 20 patients with enlarged liver and spleen due to malaria and found an increase of resistance. He explains this by postulating a removal from the circulation of a considerable proportion of the most fragile erythrocytes while the blood-forming organs react by pouring into the circulation new corpuscles having a degree of resistance above the normal.

H. H. S.

STRADOMSKY (B. N.), PETROWSKY (I. N.), POPOW (W. W.) & RUDNEW (G. P.). Ist es möglich, die menschliche Malaria künstlich auf Versuchstiere zu übertragen? [**Possibility of Transmission of Human Malaria to Experimental Animals.**]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1930. Sept. Vol. 34. No. 9. pp. 515-521. [Therap. Clinic, North Caucasian Univ., Rostov a.D.]

In September 1926, Masutaka JOSHINO published a preliminary communication on the successful transmission of the malarial parasite to various animals. As the work did not carry conviction to the authors for various reasons, they determined to control it by a further series of animal experiments. Thirty-five experiments in all were carried out in dogs and guineapigs. Blood from cases of benign and malignant infection was injected. As a result of their research the authors found that only in a very small number of cases and only in the first hours after subcutaneous or intravenous injection of malarial blood were malarial parasites seen in the blood of the animals and in very small numbers. Further investigations during 2-3 weeks never revealed the parasites in blood of the animals. They were unable to confirm the result of JOSHINO that experimental animals can be infected with human malaria.

E. D. W. Greig.

STERKIN (E. J.). Zum Studium der Regelung des Blutzuckerspiegels bei Malaria. [**Blood Sugar Level in Malaria.**]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1930. Sept. Vol. 34 No. 9. pp. 504-515. [19 refs.] [Ukraine Inst. for Protozool. Research, Kharkov.]

The author made blood sugar estimations in cases inoculated with benign tertian malaria and in cases of the natural infection. He concludes from his observations that: (1) A course of inoculation malaria (16 attacks) causes no alteration in the blood sugar regulating mechanism (2) The alterations in the blood sugar level both during the attacks and in the intervals appear not to be specific for malaria since similar deviations occur in fever shown to have a different etiology. During the attack hyper-, normo- or hypoglycaemic values are observed. Most frequently the lowest values are at the beginning and end of the attack, but high levels may be observed at the peak. In the intervals the blood sugar level does not exceed the normal limit; hyperglycaemic values were only observed in 15 per cent. of the cases.

E. D. W. Greig.

KOPELOFF (Nicholas). **Inoculation Malaria: Sexual and Asexual Strains.**—*Amer. Jl. Med. Sci.* 1930. June. Vol. 179. No. 6. pp. 800-803. [3 refs.]

The use of an asexual strain of malaria in the treatment of general paralysis eliminates the possibility of accidental transmission by mosquitoes to other members of the community. A strain of benign tertian malaria, containing gametocytes, was inoculated into 35 men and 88 women between May 1928 and August 1929. During the first six months, gametocytes were found in every case, and in about 70 per cent. of the slides examined. In the last nine months, there was considerable reduction, and, in some of the cases, no gametocytes appeared. This reduction was more pronounced in female patients than in males. The author concludes that "a sexual strain of malaria, upon

repeated human passage, loses its capacity to produce sexual forms." The inoculations were generally given intravenously. The actual number of passages is not clearly stated.

W. F.

PUNTIGAM (Franz). Ein Beitrag zum Fieberverlauf der Impfmalaria bei syphilitischen Erkrankungen des Zentralnervensystems. [**Temperature Curve of Inoculation Malaria in Nerve Syphilis.**]—*Med. Klin.* 1930. Aug. 15. Vol. 26. No. 33 (1340). pp. 1221-1223. [20 refs.] [General Hosp., Vienna.]

In 187 patients suffering from nerve syphilis the author studied the effect of three different strains of malaria (*P. vivax*) on the course of the fever. From his observations it became apparent that if a pure strain of malaria is injected once, a tertian type of fever is produced, even in general paralytics. A pure strain of malaria being defined by him as one from a case which had been inoculated once only, had had no previous malarial infection, and had received no quinine during the fever. A possible influence of the condition of general paralysis on the course of the fever was not established.

E. D. W. Greig.

WENDLBERGER (Julius). Impfmalaria und Isoagglutination. [**Inoculation Malaria and Isoagglutination.**]—*Wien. Klin. Woch.* 1930. July 24. Vol. 43. No. 30. pp. 932-935. [16 refs.] [Dermat. Clinic, Univ., Graz.]

As the result of three years' investigation on the connexion between blood grouping and inoculation malaria the author reaches the following conclusions: (1) The incubation period is twice as long in incompatible as in compatible blood groups. (2) The quotidian type of fever is much more frequent in compatible whilst the pure tertian type occurs almost always in incompatible blood groups. (3) The initial fever is much more frequent, of longer duration, and greater intensity in compatible blood groups. (4) Transfusion accidents, in the form of rise of temperature, rigor, sickness, difficulty of breathing, occur only in incompatible blood groups. [See this *Bulletin*, Vol. 24, p. 754.]

E. D. W. Greig.

GREEN (Richard). **Observations on Some Factors influencing the Infectivity of Malarial Gamete Carriers in Malaya to *Anopheles maculatus*.**—*Bull. Inst. Med. Res. Federated Malay States.* 1929. No. 5. 41 pp. With 2 coloured charts. [40 refs.]

Is it worth while attempting to reduce malaria generally throughout the Malay States, by the drug treatment of human carriers of gametocytes? Comparatively few of these carriers come into the hospitals for treatment, those who do come will not stay there after their symptoms have been relieved, and Dr. Green concludes that the general adoption of gamete carrier control in Malaya does not appear to be justified at present. (See United Fruit Co. Report, this *Bulletin*, Vol. 27, 1930, p. 186.) On the other hand, he considers that this method, in conjunction with the anti-malarial measures now in force, may be effective on estates and in small, easily-controlled areas.

The conditions bearing on the infection of the mosquito by man were investigated. Laboratory bred specimens of *A. maculatus*, the principal

malaria-carrying species of inland districts, were fed on 39 cases carrying gametes of *P. falciparum*, 20 cases with gametes of *P. vivax*, and 21 cases with gametes of *P. malariae*. Each mosquito had one feed only. *A. maculatus* proved readily susceptible to infection with *P. falciparum* and *P. vivax*; sporozoites were found in 74.3 per cent. of the former infections, and 62.5 per cent. of the latter. Very different results were obtained in the case of *P. malariae*, and it seems doubtful if *A. maculatus* can transmit quartan malaria; batches of 10 were fed on twenty patients, but sporozoites developed in none of the mosquitoes though oöcysts were found in a few of those which had fed on two of the cases. No true correlation was found between the number of gametocytes in a malaria patient's blood, and his power to infect mosquitoes. It appeared, however, that "the minimum number of gametes necessary to infect *A. maculatus* was, in the case of *P. falciparum*, one to 200 leucocytes, or 42 per 1 cmm. of blood; in the case of *P. vivax*, one to 1,000 leucocytes, or 10 per 1 cmm. of blood; and with *P. malariae* one to 330 leucocytes, or 27 per 1 cmm. of blood." In several cases patients with relatively few gametocytes were infective, while others, with many more in their blood, were not so. On this account a number of other conditions was investigated, such as the temperature of the patient, the presence of trophozoites, variations in the haemoglobin content, the number of leucocytes, the blood group, enlargement of the spleen. None of these proved to influence infectivity for the mosquito except, possibly, the last; for enlargement of the spleen was more common among cases which failed to infect *A. maculatus*. Various authorities have supposed that the proportion of male to female gametes is a factor in infectivity. Dr. Green found no evidence of this in subtertian or quartan malaria, but in benign tertian he considered it possible that there was less infectivity when the female gametocytes were greatly in excess of the males. He did not find that quinine treatment of the human host impeded the development of the gametes in the mosquito. "The viability of the gametes of *P. falciparum* is not affected by past or recent quinine treatment. As distinct from reducing the number of gametes in the blood, it is somewhat doubtful whether, in addition, quinine affects the viability of the gametes of *P. vivax* and *P. malariae*."

W. F.

ARAGÃO (Henrique de Beaurepaire). [In Portuguese & English.] Evolução dos gametos do *Plasmodium falciparum*. (Nota preliminar.) **Evolution of the Gametes of *Plasmodium falciparum*. (Preliminary Note.)**—*Mem. Inst. Oswaldo Cruz*. 1930. Vol. 24. No. 2. In Portuguese pp. 41-48. With 42 coloured figs. on 1 plate. [8 refs.] In English pp. 49-56. With 42 figs. on 1 plate. [8 refs.]

The author studied the evolution of the gametes in subtertian malaria by means of spleen puncture. The films were allowed to dry, were fixed in alcohol, and stained with Giemsa. An excellent coloured plate is given. The early male gametes are small solid bodies without vacuoles and, as they become older, the resemblance to quartan parasites increases. The young female gametes are very narrow protoplasmic ribbons, stretched across the corpuscles like quartan bands; they carry a spot of chromatin at one end, or drawn out along the edge.

W. F.

Row (R.). **Further Observations on the Morphology of *Plasmodium falciparum* with Special Reference to the Findings in Two Fatal Cases of Malaria.**—*Indian Jl. Med. Res.* 1930. July. Vol. 18. No. 1. pp. 221–225. With 8 figs. (3 coloured) on 2 plates. [1 ref.] [Grant Med. College, Byculla, Bombay.]

The reduction in the number of merozoites within the schizont and the subsequent formation of gametocytes appear to occur more rapidly in mixed infections. In a mixed culture of *P. falciparum* and *P. vivax*, in glucose ascitic fluid, the subtertian schizonts developed normally; but, on subculture, the next generation contained no more than four merozoites per schizont, and further subculture failed. It is suggested that mixed infections, by favouring the production of gametes, may be responsible for the presence of carriers in endemic areas.

In a fatal case, parasites were found in almost every cell of the capillaries of all the internal organs except the liver. The parasites had probably undergone a rapid and uncontrolled multiplication when the patient was dying, and the merozoites had invaded almost every blood-cell. At the same time they had undergone morphological changes characterized by shrinkage of the cytoplasm, destruction of the chromatin, and precipitation of haemozoin within their bodies; consequently they appeared as dark brown dots surrounded by a thin rim of protoplasm.

W. F.

DOMINICI (Ada) & ROCCA (Giuseppe Cascio). Sulla coltura "in vitro" dei parassiti malarici (*Plasmodium vivax* e *P. falciparum*). (**On the Culture "in vitro" of the Malarial Parasites (*Plasmodium vivax* and *P. falciparum*).**)—*Riv. di Malariologia.* 1930. Mar.–Apr. Vol. 9. No. 2. pp. 120–129. With 8 figs. on 1 plate. [22 refs.] [English summary pp. 205–206.] [Hyg. Inst., Univ., Palermo.]

The authors survey previous methods of cultivation of the plasmodia of malaria and find that a modification of Row's technique gives the best results. Their method is as follows:—

Blood is taken from a patient by venepuncture and 4–5 drops are placed in small tubes with a flat base containing 1 cc. of human serum inactivated by heating to 56° C. for half an hour and 2 drops of 50 per cent. dextrose. These are then placed in larger tubes [apparently Buchner's tubes] for anaerobic cultivation at 37° and 24°–26° C. When a portion is withdrawn for examination after 48 hours, a few drops of fresh defibrinated human blood is added. Attempts to cultivate in a current of air were unsuccessful.

After 48 hours nearly all the parasites had sporulated. Microphotographs well reproduced show the development at different intervals of incubation. The results were equally good at 37° C. and at 24°–26° C. The addition of the small quantity of fresh blood enables the cultivation to be renewed, otherwise the plasmodia rapidly die out.

H. H. S.

NERI (Francesco). La colorazione rapida dei parassiti della malaria col liquido di Giemsa. (**A Rapid Method for staining Malaria Parasites with Giemsa's Stain.**)—*Riv. di Malariologia.* 1930. Mar.–Apr. Vol. 9. No. 2. pp. 150–153. With 1 text fig. [1 ref.] [English summary p. 206.]

Leishman's stain carried in fluid state is liable suddenly to lose its staining properties, while if carried in form of powder there is the need also of a

balance, measures and solvent. Giemsa keeps better especially if glycerine be added. This, however, interferes with good fixation and, if used strong, Giemsa tends to precipitation and deposit. By mixing Giemsa's fluid with four times the quantity of methyl alcohol a product is obtained which will keep its properties for 15 days if placed in a yellow glass bottle. This is applied to the smear for a minute, then double the quantity of neutral distilled water for 5 minutes, after which the slide is washed in tap water. Of the three grades of slide, white, middle white, and French, the second is the best, since the others easily change with moisture yielding alkali to the preparation and thus interfering with the staining.

H. H. S.

SINTON (J. A.) & MULLIGAN (H. W.). **The Staining of Malarial Parasites in Blood Smears by the Iron-Haematoxylin Method.**—*Indian Jl. Med. Res.* 1930. Apr. Vol. 17. No. 4. pp. 1329-1332. [4 refs.]

The authors describe methods of staining in which the haemoglobin of the corpuscles and the malarial pigment are removed, so that the delicate structure of the parasites is demonstrated by the haematoxylin.

W. F.

MANALANG (C.). **The Preservation of Malarial Oöcysts and Sporozoites.**—*Philippine Jl. Sci.* 1930. Aug. Vol. 42. No. 4. pp. 481-487. With 11 figs. on 4 plates. [4 refs.]

This paper gives details of fixing and staining the stomachs and salivary glands of mosquitoes, and should be consulted in the original.

W. F.

KNIGHTS (E. M.). **The Influence of Blood Groups in Malarial Transfusions.**—*Jl. Lab. & Clin. Med.* 1930. July. Vol. 15. No. 10. pp. 980-981. [1 ref.]

In three cases of inoculated benign tertian malaria, in which the blood group of the donor and the recipient was the same, the incubation period was four days. In nine cases where the blood groups were different, the incubation period was seven to thirteen days.

W. F.

SPEIERER (Carl). Beziehungen zwischen Blutgruppenzugehörigkeit und Impfmalaria. [**Blood Grouping and Inoculation Malaria.**]—*Muench. Med. Woch.* 1930. Aug. 8. Vol. 77. No. 32. p. 1357. [7 refs.] [Dermat. Clinic, & Polyclinic, Univ., Munich.]

As a result of his observations the author concludes that it is possible to shorten the incubation period of inoculation malaria by using compatible blood groups, but it is essential also to inject at least 30 cc. of blood.

E. D. W. Greig.

DE ANDRADE (Alvaro) & PINTO (S. C. Ferreira). Incidência da malaria no Brasil—Resultados já obtidos na prophylaxia da doença.—*Archivos de Hyg.* Rio de Janeiro. 1930. May. Vol. 4. No. 2. pp. 181-195. With 1 chart & 6 plans. English summary.

ARAFI. Malarial Dysentery, with Sigmoidoscopic Appearances and Treatment by Plasmochin Compound.—*Jl. Egyptian Med. Assoc.* 1930. Apr. Vol. 13. No. 4. pp. 110-123. [4 refs.]

BANERJEE (Kartik Chandra). Cholera and Malaria.—*Indian Med. Gaz.* 1930. May. Vol. 65. No. 5. pp. 275-276.

- BASU (B. C.). Studies in the Anopheline Fauna and Malaria of Bhagalpur (Bihar and Orissa).—*Indian Med. Gaz.* 1930. July. Vol. 65. No. 7. pp. 375-379. With 6 text figs. [9 refs.]
- BERNARDO (Salud S.). Effect of Different Doses of Quinine Sulphate on the Decrease in Malarial Parasites in Peripheral Blood: Preliminary Report.—*Jl. Philippine Islands Med. Assoc.* 1930. Mar. Vol. 10. No. 3. pp. 132-137. [8 refs.]
- BISWAS (N. B. Ghosh). Three Cases of Toxaemia due to Ascariasis.—*Indian Med. Gaz.* 1930. Aug. Vol. 65. No. 8. pp. 441-442.
- BOINET. Les reveils du paludisme; leur importance clinique et thérapeutique.—*Marseille Méd.* 1930. Apr. 5. Vol. 67. No. 10. pp. 484-487.
- CAWADAS (Eus.). Les manifestations laryngologiques du paludisme latent.—*Ann. Malad. de l'Oreille, du Larynx, du Nez et du Pharynx.* 1929. Vol. 48. pp. 1112-1118.
- CAZANOVE. Un ancien traitement du paludisme.—*Rev. Méd. et Hyg. Trop.* 1930. Jan.-Feb. Vol. 22. No. 1. pp. 23-31. [1 ref.]
- CHATTERJI (C. D.). Malaria at Kapurthala Dispensary, Lucknow.—*Indian Med. Gaz.* 1930. Sept. Vol. 65. No. 9. pp. 492-494. With 2 graphs in text.
- CIABURRI (Gennaro). Isto-patologia del sistema nervoso contrale nella malaria pernicioso.—*Arch. Ital. Sci. Med. Colon.* 1930. Sept. 1. Vol. 11. No. 9. pp. 533-543. With 6 text figs. [7 refs.] English summary. [Villa Torri Lab. of Colonial Path., Bologna.]
- CORRADINI (Giuseppe). Die Malaria in Rovigno.—*Arch. f. Schiffs- u. Trop.-Hyg.* 1930. Sept. Vol. 34. No. 9. pp. 487-504.
- EHRMANN (R.). Ueber eine malariaähnliche schmerzlose Form der Cholelithiasis.—*Med. Klin.* 1930. Sept. 19. Vol. 26. No. 38 (1345). pp. 1399-1400. With 1 chart in text.
- ESQUIER (G.). Etude d'un réservoir de virus paludéen dans le région du Kroubs (département de Constantine).—*Arch. Inst. Pasteur d'Algérie.* 1929. June. Vol. 7. No. 2. pp. 181-183. With 1 map in text.
- FRANCHINI (Giuseppe). Appunti di malariologia nelle colonie italiane e sugli agenti trasmissori.—*Arch. Ital. Sci. Med. Colon.* 1930. July 1. Vol. 11. No. 7. pp. 396-398. English summary (4 lines) p. 399.
- FRANK (A. W.). Zur Plasmochindosierung.—*Arch. f. Schiffs- u. Trop.-Hyg.* 1930. July. Vol. 34. No. 7. pp. 397-398.
- GANORA (Romualdo). Notizie sul polimorfismo della malaria in Eritrea ed in Somalia e sulla sua patogenesi e terapia.—*Arch. Ital. Sci. Med. Colon.* 1930. July 1. Vol. 11. No. 7. pp. 410-417. English summary (3 lines).
- HASLÉ (Guy). Septicémie mortelle à pyocyanique chez un paludéen.—*Bull. Soc. Méd.-Chirurg. Indochine.* 1930. Mar. Vol. 8. No. 3. pp. 256-257.
- KOMENDANTOV (V.). On the Epidemiology of Malaria in the Northern Caucasus.—*Rev. Microbiol., Epidémiol. et Parasit.* 1930. Vol. 9. No. 1. pp. 90-95. [In Russian. English summary pp. 134-135.]
- LAGES (João Kelly da Cunha). Da incidencia da malaria em Ribeirão das Lages, Estado de Rio de Janeiro. Luta anti-larvaria e plasmochino therapia prophylactica.—*Archivos de Hyg.* Rio de Janeiro, 1930. May. Vol. 4. No. 2. pp. 155-179. [1 ref.] English summary.
- MAXWELL (J. S.). The Risquez Test.—*Jl. Trop. Med. & Hyg.* 1930. Oct. 1. Vol. 33. No. 19. pp. 289-292.
- MEDULLA (Candido). Sopra due casi di malaria primitiva osservati in Cirenaica. (Nota epidemiologica).—*Arch. Ital. Sci. Med. Colon.* 1930. May 1. Vol. 11. No. 5. pp. 297-301. [15 refs.] English summary (6 lines). [Colonial Hosp., Benghazi.]
- DE MELLO (Froilano). Sur l'emploi de la plasmoquine dans le traitement du paludisme.—*Bol. Ger. Méd. e Farmacia.* Bastora. 1929. May-Aug. Ser. 13. Nos. 5-8. pp. 137-144. [Med. School, Nova Gôa.]
- MURPHY (R. A.). Some Observations on the Preparation and Examination of Thick Films for Malaria Parasites.—*Indian Med. Gaz.* 1930. June. Vol. 65. No. 6. pp. 325-326.

- PAPANASTASIOU (E.). Beitrag zur Kenntniss der neueren Arzneimittel gegen Malaria.—*Arch. f. Schiffs- u. Trop.-Hyg.* 1930. Aug. Vol. 34. No. 8. pp. 450-455.
- PATERSON (A. R.). General Antimalaria Measures: the Lesson of the History of Malaria in the United States of America.—*Kenya & East African Med. Jl.* 1930. Oct. Vol. 7. No. 7. pp. 180-189. [3 refs.]
- ROMBACH (K. A.). Bijdrage tot de epidemiologie der malaria tertiana.—*Nederl. Tijdschr. v. Geneesk.* 1930. Oct. 11. 74th Year. 2nd Half. No. 41. pp. 5038-5039.
- SANDERS (J.). Bijdrage tot de epidemiologie der malaria tertiana.—*Nederl. Tijdschr. v. Geneesk.* 1930. Aug. 2. 74th Year. 2nd Half. No. 31. pp. 3889-3890.
- WOLFF-EISNER (A.). Ueber Epilepsie nach Malaria.—*Med. Klin.* 1930. Sept. 26. Vol. 26. No. 39 (1346). pp. 1452-1454.

It is with great regret that we record the death on Jan. 30 of Sir Andrew BALFOUR, K.C.M.G., who from 1913 to 1920 was a Sectional Editor (for Malaria) of the *Tropical Diseases Bulletin* and from 1921 to the date of his death a Member of the Honorary Managing Committee of the Bureau.

KALA AZAR.

IZAR (G.). La leishmaniosi viscerale nell' adulto in Italia. (Parte conclusiva di due lezioni sul kala-azar dell' adulto.) [**Visceral Leishmaniasis in Adults in Italy.**—*Riforma Med.* 1930. Oct. 6. Vol. 46. No. 40. pp. 1575-1576. [General Med. Clinic, Univ., Messina.]

The author discusses the recorded infrequency of kala azar in adults in Italy. He notes that from 1908 to 1923 JEMMA had seen over 300 cases in children up to 12 years of age but not a single one in an adult. LONGO, ABATE and DI CRISTINA, all at clinics for children, had a similar experience. Following the discovery of a case in an adult and the interest aroused especially from the point of view of a possible confusion of the disease with malaria, eight cases in adults were recorded up to 1928 while in the two following years 20 cases were noted. The author believes that cases in adults are more common than statistics indicate. This is due very largely to the fact that the disease in adults differs from that in young children, while the statistics have been compiled almost exclusively from clinics for children's diseases.

C. M. Wenyon.

TIMPANO (Pietro). La leishmaniosi interna negli adulti in Italia. Note epidemiologiche e cliniche. [**Visceral Leishmaniasis in Adults in Italy.**—*Policlinico*. Sez. Prat. 1930. June 9. Vol. 37. No. 23. pp. 837-838.

Apart from cases of infantile kala azar the author has observed the disease in adolescents and adults to the age of 32 years, and he maintains that there is no valid distinction between *Leishmania infantum* and *L. donovani*. Comparing the results of treatment with antimony potassium tartrate, the sodium salt, antimosan, and Zambelletti's antimonial injections, he finds that children are more tolerant of all of them than are adults, and that the sodium salt is tolerated by both more readily than the potassium salt. He believes that this is due in part to the physico-chemical state of the blood and in part to the condition of the vegetative nervous system. In vagotonic subjects the potassium compound causes sweating, salivation, vertigo and bradycardia, and vagotony is more marked in adults than in children. In sympathicotonic the potassium salt finds a more suitable application, since potassium acts as a stimulant to the vagus.

H. H. S.

FRANCO (Emilio Enrico) & MANAI (Andrea). Le leishmaniosi in Sardegna. [**Leishmaniasis in Sardinia.**—Reprinted from *Boll. Soc. Ital. Med. ed Igiene Colon.* (Supplement to Fasc. 4 of *Giorn. di Clin. Med.*). 19 pp. With 2 text figs. & 1 map. [12 refs.] [Inst. of Anat. & Path. Histology, Univ., Sassari.]

The authors review the eight cases of leishmania infection previously recorded in Sardinia, the first being one of oriental sore reported by LOMBARDO in 1921. Of the eight, three were cutaneous and five visceral. Two of the cutaneous and four of the visceral cases were indigenous; in the others the place where infection was contracted

was not determined. The authors now describe another visceral case in a boy of 13 years, who contracted the infection in Galtelli (on the east coast) or its immediate vicinity.

H. H. S.

GUALDI (A.). Il quinto caso di leishmaniosi viscerale osservato in Sardegna. [**The Fifth Case of Kala Azar observed in Sardinia.**]—*Pediatrics*. 1930. Aug. 1. Vol. 38. No. 15. pp. 834-840. [17 refs.] [Inst. of Path. Med., Univ., Rome.]

Sardinia was considered to be free from kala azar till LURIDIANI and MARCIALIS in 1921 published an account of the first case in a youth 18 years of age. In 1925 DE VILLA described a second in an infant one year old, while MARCIALIS in 1928 described two further cases in boys from the village of Bitti. The author now records the fifth case in a boy of 13.

C. M. W.

NEUMANN (C. Zahra). **Infantile Leishmaniasis in Malta.**—*Jl. Trop. Med. & Hyg.* 1930. Nov. 1. Vol. 33. No. 21. pp. 318-321. With 2 charts in text. [Central Civil Hosp., Malta.]

Infantile kala azar was first recognized in Malta about 1910. Since the War the disease has appeared commoner, but this may be due to more accurate diagnosis. The author states that the disease attacks children exclusively and that the few cases described from adults by naval doctors have not been authenticated by spleen puncture. [This statement is certainly incorrect; see for example BASSETT-SMITH, this *Bulletin*, Vol. 5, p. 266 and Vol. 21, p. 251.] The youngest case seen was in a child seven months old and the oldest in one of eleven years. The majority are children just under to just over two years of age. Certain villages are endemic centres and in these many cases come from one part of the village, often from neighbouring houses of one street. Though the families are, as a rule, very large, few show more than one case. Clinically the cases are similar to those in other endemic areas. Treatment was formerly carried out by intravenous injections of tartar emetic. Owing to the toxic effects of this drug and the liability of those receiving it to get bronchopneumonia, treatment with neostibosan was introduced. The drug can be given intramuscularly without any irritation and with a therapeutic effect equal to that of intravenous injection. The majority of children received 0.2 gm. at the third injection, a total quantity of 2.5 gm. being given in twelve injections in a period of six weeks. In twelve cases in a series of sixty, between twenty and twenty-four injections were necessary. Of these sixty cases seven terminated fatally, five from bronchopneumonia, one from diarrhoea and marasmus, and one patient, who was in a dying condition when seen, after the second injection. Noma has not been seen as a complication since neostibosan has been used, while bronchopneumonia is less frequent. Some cases were successfully treated by an intensive course of daily intramuscular injections of 0.15 gm. for ten days, and this, in the author's opinion, is the method of choice.

C. M. W.

TIMOFFEWA (M. E.). [On the Incidence of Visceral Leishmaniasis in Samarkand.]—*Pensée Méd. d'Usbéquistan et de Turquénistan*. Tashkent. 1930. Vol. 4. No. 9-10. pp. 57-68. With 2 charts in text. [In Russian.]

During the last three years (1927-1929) 177 cases of kala azar have been recorded at the Samarkand Station of Tropical Medicine, Turkestan, the diagnosis being based on spleen puncture. On comparing these figures with those for the preceding three years it is seen that the incidence remained fairly constant varying from 54 to 64 cases per annum. It is noted, however, that a proportion of cases escape detection being diagnosed by private practitioners as malaria. Out of 38,211 children 1·3 per cent. were affected, the majority (0·7 per cent.) being under the age of three. Nationality seems to be of no importance. As regards sex, 62·2 per cent. were males and 37·8 per cent. females. The fatality in 1927-28 was 40·3 per cent., being greatest amongst children under three years old, and diminishing with age.

C. A. Hoare.

ADLER (S.) & THEODOR (O.). **The Behaviour of Insect Flagellates and Leishmanias in *Phlebotomus papatasi*.**—*Ann. Trop. Med. & Parasit.* 1930. July 8. Vol. 24. No. 2. pp. 193-196. [3 refs.] [Microbiol. Inst., Hebrew Univ., Jerusalem.]

The authors have already shown that when ingested by *Phlebotomus papatasi* various species of *Leishmania* differ in their behaviour. *L. tropica*, whether ingested from culture or from the sore, multiply, ascend the cardia and pharynx and in a few cases enter the proboscis. Of four strains of *L. donovani* of Mediterranean origin and two of *L. tarentolae* all behave like *L. tropica* with the exception of one strain of *L. donovani* which does not pass from the stomach. Two other strains of *L. donovani* from Naples produce a low infection rate, but the parasites when once established pass to the top of the cardia and attach themselves to the rhabdiorium. Two Indian strains of this parasite behave similarly if ingested in sufficient quantities but the infection tends to die out. An abnormally short strain from China is restricted to the stomach even when as many as 8,000 parasites are ingested. Of two strains of *L. brasiliensis* one, a short form, remains in the stomach while the other ascends and attaches itself to the rhabdiorium. *L. ceramodactyli* adopts a typically posterior position in the hind-gut, but in addition flagellates ascend to the cardia, attach themselves to the rhabdiorium and even enter the pharynx if the infection is a very heavy one. The behaviour of *L. tropica* and *L. ceramodactyli* is regarded as indicating specific development in the fly. That of the other strains is interpreted as proving that *P. papatasi* is not the normal vector, for ascent to the cardia and pharynx only occurs when very large infective doses are ingested, whereas with *L. tropica* this is independent of the dose. A strain of *L. agamæ* behaves in an irregular manner, sometimes ascending to the cardia and at others descending to the hind-gut. A number of insect leptomonads—*Herpetomonas culicidarum*, *H. oncopelti*, *H. lygaeorum* and *H. muscidarum* and one from a plant *H. oncopelti*—have been studied in *P. papatasi*. These persist in the stomach for periods varying up to thirteen days and in some cases pass to the hind-gut. They show no tendency to ascend to the cardia. In the case of *H. culicidarum*, though, as with *L. tropica*, fresh human blood rapidly destroys the

flagellates *in vitro*, a feed of human blood does not injure flagellates already in the stomach of the fly. This is due to the rapid destruction of complement in the stomach of the fly. It is clear that the development of the insect and plant flagellates in *P. papatasi* is an illustration of a non-specific behaviour. The observations indicate that the behaviour of *L. tropica* in the fly is no mere accident but an indication of a specific relationship between the fly and the parasite.

C. M. W.

ADLER (S.) & THEODOR (O.). **The Inoculation of Canine Cutaneous Leishmaniasis into Man and the Behaviour of Various Strains of Leishmania in Mice.**—*Ann. Trop. Med. & Parasit.* 1930. July 8. Vol. 24. No. 2. pp. 197–210. With 5 figs. on 2 plates. [6 refs.] [Microbiol. Inst., Hebrew Univ., Jerusalem.]

Though observers have shown that the inoculation of *Leishmania tropica* into the skin of dogs gives rise to lesions resembling oriental sore, no one has performed the converse experiment by inoculating human beings from the naturally occurring sore of dogs. This the authors have now done with a strain isolated from a dog in Baghdad. A volunteer was inoculated on the left arm at two spots with cultures of the parasite and similarly on the right arm with flagellates from *Phlebotomus papatasi* infected from cultures. Though two papules developed at the spots inoculated with flagellates from the flies, no parasites could be discovered in them and they had disappeared in five to six weeks. On the left arm, however, two papules were observed after about six weeks and shortly after this parasites were demonstrated in the lesions. The result was unexpected, for the authors have failed on several occasions to produce oriental sore in human beings with cultures of *L. tropica* from human cases, but have succeeded with the same flagellates which had established themselves in *P. papatasi*. They have likewise succeeded with flagellates from naturally infected flies and from flies fed on oriental sore cases. The experiment proves that the oriental sore of dogs in Baghdad is caused by the same parasite as that producing the disease in man. A dog was infected in both ears by cultures of a Palestinian strain of *L. tropica* and by the same strain passed through *P. papatasi*. Before inoculation into the dog the strain had the following history: recovered from a naturally infected fly in Jericho—inoculated into one human being and then into another—cultures—inoculated into a mouse—cultures. Histologically one of the papules which developed on the left arm of the volunteer resembled naturally occurring oriental sore of man.

The Baghdad dog strain of *L. tropica* failed to infect the tails of mice, whereas cultures of visceral canine leishmaniasis obtained from NICOLLE in Tunis readily produced infections. A human strain from a case of infantile kala azar in Naples also failed to produce lesions in mice, though the Palestine strain of *L. tropica* and the Tunis strain referred to above both gave rise to visceral and cutaneous infections after intraperitoneal inoculation. Though the Baghdad dog strain failed at first to infect mice, after the successful injection of the volunteer cultures obtained from one of the lesions were found to be slightly infective to mice. Mice were successfully infected with a South American strain, and one animal in addition to the lesions at the site of inoculation in the tail developed secondary lesions at the nape of the neck, thus demonstrating the conveyance of parasites by the blood stream from one site

to another. As a result of these somewhat conflicting experiments the authors advise caution in drawing conclusions as to the identity or difference of parasites. The Baghdad dog strain was found to behave in *P. papatasi* like *L. tropica* from man, though the infection rate was lower and there was a tendency for it to die out in about nine days. The flagellates ascend the cardia, attach themselves to the rhabdiorium and enter the pharynx in large numbers.

C. M. W.

ADLER (S.) & THEODOR (O.). **Infection of *Phlebotomus perniciosus* Newstead with *Leishmania infantum*.** [Correspondence].—*Nature*. 1930. Sept. 20. Vol. 126. No. 3177. p. 437.

The authors record experiments conducted in Catania with *Phlebotomus papatasi* and *P. perniciosus* in their relation to infantile kala azar. Both these flies had been infected by feeding on hamsters infected with the local strain of *Leishmania donovani*. There was a marked difference, however, in the percentages which became infected. Of 18 *P. perniciosus* 15 were positive, while of 123 *P. papatasi*, which moreover ingests a larger volume of blood, only one was positive. In both flies the flagellates tended to assume an anterior position, but in the case of *P. perniciosus* at a temperature of 29° C. to 30° C. flagellates were found in the pharynx three and a half days after feeding. *P. papatasi* was also infected by feeding on human bone marrow, but no infection occurred if smears of the material showed less than one parasite per 40 fields (Oc. 4 Obj. $\frac{1}{2}$). By culture methods parasites have been demonstrated in the blood of almost 100 per cent. of cases of infantile kala azar, but a concentration of parasites in the blood giving one parasite per 40 fields has never been seen. It is concluded that *P. papatasi* can be excluded as an important vector, while *P. perniciosus*, which gives a high infection rate after the ingestion of relatively few parasites, should be considered as a good carrier of kala azar in Italy.

C. M. W.

BLANC (Georges) & CAMINOPETROS (J.). Sensibilité du spermophile de Macédoine (*Citillus citillus*) au kala-azar méditerranéen. [**Susceptibility of the Macedonian Spermophile to Mediterranean K.A.**].—*C.R. Acad. Sci.* 1930. Nov. 3. Vol. 191. No. 18. pp. 800-802.

The authors have discovered that the Macedonian spermophile (*Citillus citillus*) is very susceptible to kala azar whether of human or canine origin. Infection takes place very readily after inoculation by the cutaneous, subcutaneous, subconjunctival, intraperitoneal, intratesticular or intrahepatic routes of cultures or parasites from the spleen of human cases or the organs of experimental animals. The animals live from one to five months. In fifteen days the spleen and liver are rich in parasites, which can also be found in the circulating blood. On the death of the animal parasites can be found in the blood and in all the organs, including the healthy and ulcerated areas of the skin. On section of the organs the general microscopic appearance is that of masses of heavily parasitized macrophages in the vicinity of the vessels—a picture of a veritable blockage of the reticulo-endothelial system with leishmania. Inoculated with the parasite of oriental sore the animals do not develop a generalized infection. It is pointed out that

as the blood of infected animals is rich in parasites, blood-sucking arthropods can be infected. It is noted that infections have been produced by the subcutaneous inoculation with crushed arthropods several days after they had fed on infected animals.

This small marmot of Greece, which is as susceptible to kala azar as the guineapig to tuberculosis, lives in large colonies upon dry ground near water and close to fields of cereals. It is abundant in Eastern Macedonia from Salonika to Florina, is easily kept in captivity, and should become a useful laboratory animal.

C. M. W.

GUPTA (B. M. Das). **The Diagnosis of Kala-Azar by Culture of the Peripheral Blood.**—*Indian Med. Gaz.* 1930. Sept. Vol. 65. No. 9. pp. 489-492. [10 refs.]

In 1914 Row pointed out that successful cultures of leishmania from the peripheral blood of cases of kala azar could be obtained by removing blood from a vein, diluting it with several volumes of citrated saline solution, centrifuging and inoculating tubes of N.N.N. medium with the cellular deposit. By following this technique with the modification of allowing the cells to sediment in the cool incubator instead of centrifuging the author has cultivated flagellates from 95.9 per cent. of 169 cases of untreated kala azar. The average number of days for the appearance of flagellates is 11.4. On two occasions tubes examined on the tenth day showed only motile bacilli which were identified as *Bact. typhosum* and *Bact. paratyphosum* A. On another occasion both leishmania and *Bact. paratyphosum* B were present. It is thus seen that organisms of the typhoid group can grow in N.N.N. medium at a temperature of 22° C. As regards treated cases of kala azar, in most the parasites disappear from the peripheral blood after the first injection.

C. M. W.

PARADISO (F.). Sulla diagnosi di leishmaniosi interna infantile mediante culture dal sangue periferico e dal midollo osseo. [**Diagnosis of Infantile Kala Azar by Culture of Blood and Bone Marrow.**]—*Policlínico. Sez. Med.* 1930. Oct. 1. Vol. 37. No. 10. pp. 494-500. [34 refs.] [Inst. of Clin. Pediatrics, Univ., Catania.]

The author records the successful culture of leishmania from the peripheral blood of all of 15 cases of infantile kala azar in Catania. The medium employed was the semi-solid one adopted by ADLER and THEODOR for the cultivation of these organisms. Each tube was inoculated with one to three drops of blood and flagellates were found after 11 to 30 days' incubation at 22° C. The uniformly positive results obtained show that the method is of diagnostic value.

C. M. W.

BUROWA (L. F.) & MOLTSCHANOW (S. A.). Einfluss der Röntgenstrahlen auf die Kulturen von Leishmania. [**Influence of X Rays on Cultures of Leishmania.**]—*Pensée Méd. d'Usbéquistan et de Turquéménistan.* Tashkent. 1930. Apr.-May. No. 7/8. pp. 47-57. With 3 text figs. [29 refs.] [In Russian script. German summary p. 124.]

Exposing cultures of *Leishmania tropica* and *L. donovani* to Röntgen rays, the authors find that the two strains are equally susceptible and are rapidly destroyed by a dose of 75 per cent. to 100 per cent. H E D. Röntgen rays cannot be regarded as in any way specific as a therapeutic

agent since antimony preparations destroy the flagellates even more quickly; nevertheless such therapeutic results as follow the use of the rays in cutaneous and visceral leishmaniasis are probably due to their destructive action on the parasites.

C. M. W.

Row (R.). **On a Simple Solidified Haemoglobinised Saline Agar Medium suitable for Surface Cultures of Leishmania and Allied Flagellates.**—*Indian Med. Gaz.* 1930. June. Vol. 65. No. 6. pp. 319–320. With 3 text figs. [3 refs.] [Grant Med. College, Bombay.]

In order to overcome the difficulties associated with the culture of leishmania on the surface of solid media in Petri dishes, the author has devised a method for carrying this out in wide test tubes, one inch in diameter.

In each tube place 6 cc. of an ordinary 3 per cent. agar in normal saline. When required the agar is melted and to each tube is added an equal volume of haemoglobinized saline [see *B.M.J.*, 1912, May 18, p. 1119]. After mixture, the tubes are sloped and when the medium is solid it is incubated in the upright position at 37° C. for some hours and then in the ice box. The liquid of condensation is then removed carefully with a pipette and kept sterile for subsequent use. The tubes are left with the surface of the medium uppermost in order to obtain a dry surface, which is then inoculated at some distance from the bottom with a drop or two of culture. The tubes are again left till the surface appears dry, after which 1 to 2 cc. of the condensation fluid are introduced into the bottom of the tube, care being taken not to moisten the surface of the medium. The tubes are then incubated in the slanting position with the surface downwards. By this method the rich cultures which are obtained in the Petri dish are secured without difficulty.

C. M. W.

CHODUKIN (N. J.) & SOFIEFF (M. S.). **Zur Frage der Identität von *Leishmania donovani* und *Leishmania canis*. [The Question of Identity of *L. donovani* and *L. canis*.]**—*Arch. f. Schiffs- u. Trop.-Hyg.* 1930. July. Vol. 34. No. 7. pp. 369–382. [15 refs.]

The paper describes serological investigations with leishmania from human and canine cutaneous and visceral infections. They were undertaken to determine the possibility of distinguishing the strains serologically. Rabbits and mice were immunized by injections of cultures and their sera were tested by the adhesion reaction, microscopic and macroscopic agglutination and the effect they had on the growth of the organisms in cultures. The conclusion reached is that the identification of leishmania by serological reactions is not so simple as some observers have supposed, for each strain isolated may have features of its own.

C. M. W.

BOYD (T. C.) & BOSE (B. K.). **The Ultra-Violet Absorption Spectra of Sera in Tropical Diseases, Kala Azar.**—*Indian Jl. Med. Res.* 1930. July. Vol. 18. No. 1. pp. 267–272. With 5 figs. (2 on 1 plate). [Med. College, Calcutta.]

The absorption spectra of blood sera in the ultra-violet region having been systematically studied by Judd LEWIS,* the authors were led to

* *Proc. Roy. Soc. B.* 89, 1916, 327.

compare his results with the serum of kala azar cases. As regards normal sera, the results obtained were almost identical with those of Judd Lewis. For kala azar sera the absorption curve was distinctly different from the normal. This was due not only to a difference in the concentration of the total protein of the serum, but probably also to some change in the nature of the proteins or to some change in their relative amounts.

C. M. W.

GHARPURÉ (P. V.). **Chopra's Antimony Test in a Non-Endemic Kala-Azar Area.**—*Indian Med. Gaz.* 1930. July. Vol. 65. No. 7. pp. 389-390. [Grant Med. College, Bombay.]

CHOPRA's antimony test for kala azar was applied by the finger-prick method (this *Bulletin*, Vol. 27, p. 616) to a series of 266 cases in an area in the Bombay Presidency which is free from kala azar. In a 1 in 5 dilution 5 cases, and in a 1 in 10 dilution 2 cases were positive. The serum test was carried out with 199 sera, chiefly those sent for the Wassermann reaction. With undiluted sera 19.6 per cent. were positive and with 1 in 5 dilution 1 per cent.

C. M. W.

PIKUL (J.). Ein Fall von Hämoglobinurie bei viszeraler Leishmaniose. [**Haemoglobinuria in a Case of Visceral Leishmaniasis.**]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1930. July. Vol. 34. No. 7. pp. 358-360.

The case is that of a female child three years of age who was suffering from visceral leishmaniasis contracted in Tashkent. Between June 10th and August 16th, 1928, seventeen injections of antimosan were given. After an interval of three weeks treatment with stibosan was commenced, eighteen injections being given between September 1st and December 1st. During this period there was no improvement, the child suffering twice from pneumonia and once from an enterocolitis simulating dysentery. Treatment with antimosan was recommenced on December 8th with an intravenous injection of the same dose as that given at the commencement. In three to five minutes after the injection there was pain over the kidneys, convulsions and rigor. The pupils were dilated, the pulse was thread-like and rapid and the general condition semi-comatose. In fifteen to twenty minutes 150 cc. of wine-coloured urine was passed. A few minutes before the injection the urine had been normal. The rigors and convulsions lasted for an hour, while the temperature rose to 40.5° C. Urine was passed frequently and in small quantities, the colour gradually changing to normal during the course of 16 hours. By the evening the condition was improved though the temperature was 40.6° C. On the following day there was slight jaundice, while the urine contained albumen and casts. Though no further specific treatment was given a gradual improvement set in, so that 2½ months after the attack of haemoglobinuria complete recovery from the leishmania infection had taken place.

C. M. W.

CARONIA (G.). **The Therapy of Internal Leishmaniasis.**—*Amer. Jl. Trop. Med.* 1930. July. Vol. 10. No. 4. pp. 261-281. [3 refs.] [George Williams Hooper Foundation for Med. Research, Univ. of California, San Francisco.]

The author reviews the progress of the treatment of kala azar to the time of the introduction of tartar emetic by himself and DI CRISTINA in 1915. He is convinced that tartar emetic remains the best remedy for the disease when it is possible to administer it intravenously. He does not think that better results are obtained with the more recently

introduced organic antimony compounds. When, especially in children, it is not possible to give tartar emetic intravenously stibenyl administered intramuscularly is the best substitute. It can be injected into the gluteal muscles in a dose of 5 to 10 cgm. for infants, 10 to 15 cgm. for other children, and 15 to 20 cgm. for adults at intervals of two or more days. It gives a moderate local infiltration and quite insignificant general symptoms. It can bring about recovery, but more slowly than antimony tartrate, and may provoke antimony resistance and tolerance.

C. M. W.

TIMPANO (P.). Un caso di kala-azar guarito con la splenectomia. [**Case of K.A. cured by Splenectomy.**]—*Policlino.* Sez. Prat. 1930. Nov. 24. Vol. 37. No. 47. pp. 1710-1711. [14 refs.]

The case referred to is that of a child five years of age. As the condition became worse in spite of treatment with tartar emetic splenectomy was performed. After the operation the fever quickly subsided and rapid improvement followed. Two months later the child was in good condition and was discharged as cured. The author thinks that the operation should be performed in cases which do not respond to treatment.

C. M. W.

PARROT (L.), DONATIEN (A.) & LESTOQUARD (F.). Sur le développement du parasite de la leishmaniose canine viscérale chez *Phlebotomus major* var. *perniciosus* Newstead. [**Development of the Parasite of Canine Kala Azar in *P. major* var. *perniciosus*.**]—*Bull. Soc. Path. Exot.* 1930. July 9. Vol. 23. No. 7. pp. 724-726. [1 ref.] [Pasteur Inst. of Algeria, Algiers.]

A dog suffering from kala azar and manifesting numerous secondary skin lesions was housed in a separate compartment of the kennels at the Pasteur Institute of Algiers. Each morning the compartment was examined for *Phlebotomus perniciosus*, the only species to be found there. The engorged females were captured and kept in a humid atmosphere for dissection one or more days later. In 4 of 53 specimens thus examined on the third day numerous leptomonas were found in the stomach. Up to the present the flagellates have not been found in any other part of the intestine. There can be no doubt that the flagellates had their origin in the leishmania infection of the dog, and as the sand-flies feed as readily on man as they do on the dog the danger to public health of infected dogs, particularly those with skin lesions which are common in Algiers, is evident.

C. M. W.

RAMPON (L.). La leishmaniose canine à Bouira (dépt. d'Alger). [**Canine Kala Azar at Bouira (Algiers).**]—*Rev. Vét. et J. de Méd. Vét.* 1930. Sept. Vol. 82. pp. 502-506.

A case of kala azar in a child having occurred at Bouira in Algeria the canine disease was looked for, with the result that 12 cases were discovered during the four months July to October 1929. The author gives a clinical account of the disease in the dog. Treatment consists in injecting intravenously a 1 per cent. solution of tartar emetic on alternate days till four injections have been given. After a week's

interval in most cases it is necessary to give another course, which may have to be followed by one or two further ones. According to the weight of the animal the dose is 1 to 3 cc. for the first two injections and 3 to 5 cc. for the subsequent ones.

C. M. W.

MILLS (E. A.) & MACHATTIE (C.) in collaboration with CHADWICK (C. R.). **The Histopathology of Oriental Sore with Special Reference to its Natural Occurrence in the Dog.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1930. June 30. Vol. 24. No. 1. pp. 67-74. With 48 figs. on 4 plates.

Canine oriental sore in Baghdad commences as a deeply seated nodule detected only on palpation. Later the nodule is superficial and later still ulceration occurs. The parasites appear to be inserted first into the deep tissues of the dermis at a depth corresponding with the length of the proboscis of a sandfly. There follows a local concentration of macrophages which gradually extend in the dermis, particularly towards the skin surface. Perivascular infiltration with plasma cells is a marked feature of the lesion. Each macroscopic nodule usually results from the fusion of several microscopic masses. Ulceration is the result of upward pressure and coagulation necrosis of the thinned epidermis. Before ulceration occurs polynuclear leucocytes are rarely present. In well-developed lesions there is slow degeneration of leishmania in older cells while those more peripherally situated are healthy in appearance.

C. M. W.

PORTUGAL (Hildebrando). Contribución al estudio de la histopatología de la leishmaniosis tegumentaria cutánea. [**Histopathology of Dermal Leishmaniasis.**]—*5a Reunión Soc. Argentina Patol. Regional del Norte, Jujuy, 7 al 10 Octubre, 1929.* Vol. 1. pp. 549-560. With 3 text figs. [21 refs.] [Lab. of Dermat. Clinics, Faculty of Med., Rio de Janeiro.]

The author has studied the histopathology of cutaneous leishmaniasis in Brazil. He divides the cases into ulcerating and non-ulcerating. The former are subdivided into ecthematoid and frankly ulcerating types and the latter into framboesial and verrucosal types. He gives a brief review of previous work on the subject, describes the main features of his own cases, and concludes that disagreement amongst histologists can be accounted for by the fact that the exact histological picture changes with the course of the disease.

C. M. W.

MUIR (E.). **The Differential Diagnosis of Leprosy and Dermal Leishmaniasis.**—*Indian Med. Gaz.* 1930. May. Vol. 65. No. 5. pp. 257-258. With 3 text figs. [2 refs.]

The author calls attention to the possibility of mistaking post kala azar dermal leishmaniasis for leprosy. This is particularly true of two types of the leishmaniasis, namely, that with depigmented skin areas and the nodular or xanthoma type. The history of previous kala azar and the discovery of leishmania in the lesions should prevent an error in

diagnosis. During the first ten months of 1929 nine such cases appeared at the leprosy clinic in Calcutta. It seems probable that in many other endemic areas of kala azar, patients are being treated for leprosy instead of for dermal leishmaniasis which yields to antimony treatment.

C. M. W.

AGRONICK (M.). Die Hautleishmaniosis in Russland. [**Dermal Leishmaniasis in Russia.**]—*Arch. f. Dermat. u. Syph.* 1930. May 27. Vol. 160. p. 126.

The wide distribution of oriental sore in Turkestan and Transcaspia has led one Russian author to suggest that the disease is hereditary. In the years 1923 and 1924 there were registered from four divisions of the Turkoman Republic 965 and 916 cases respectively. An examination of 1,216 persons in factories, schools, etc., in Merv showed that 761 either had oriental sore or had recovered from it. In three cases the author obtained a cure with preparations of bismuth.

C. M. W.

BERNASCONI (Vicente). Consideraciones sobre el censo de leishmaniosis. [**A Census of Leishmaniasis.**]—*5a Reunión Soc. Argentina Patol. Regional del Norte, Jujuy, 7 al 10 Octubre, 1929.* Vol. 1. pp. 561-573.

In order to obtain information regarding the distribution of cutaneous leishmaniasis in Northern Argentina medical men were requested to send in returns of cases which came under their notice. This census has resulted in a record of 381 cases which were distributed as follows:—Salta 253, Jujuy 119, Tucumán 2, Santiago del Estero 3, Bolivia 4. It is fully realized that these figures in no way give a correct idea of the extent of the disease.

C. M. W.

REVUE DE MÉDECINE ET D'HYGIÈNE TROPICALES. 1930. Sept.-Oct. Vol. 22. No. 5. pp. 209-232. Le bouton d'Orient. [**Oriental Sore.**]—1°. Petite chronique [TRABAUD (J.)]. pp. 209-210. 2°. "Leishmaniose cutanée" ou "bouton d'Orient" (Salek) à Alexandrie d'Egypte [PANAYOTATOU (Angélique)]. pp. 211-220. With 5 text figs. [9 refs.] 3°. Notes cliniques sur le bouton d'Alep [CHEVALIER (G.)]. pp. 221-228. 4°. Le bouton d'Orient à Damas [EL KHANI]. pp. 229-232.

The series of papers on oriental sore in Alexandria, Aleppo and Damascus is preceded by a foreword by the first author. The second author describes her experiences of the disease in Alexandria and mentions 5 cases previously described (this *Bulletin*, Vol. 21, p. 259 and Vol. 26, p. 328) together with 4 recorded for the first time. One of these had already been reported as a case of kala azar (this *Bulletin*, Vol. 27, p. 614) but it is now noted that the child had previously suffered from oriental sore. The third author discusses the disease in Aleppo, giving figures of age and sex incidence, location and number of lesions and duration of the disease, based on 671 cases. The fourth author states that 10 years

ago, apart from imported cases from Aleppo and Baghdad, Damascus was free from oriental sore but that since then the disease has gradually established itself.

C. M. W.

DUPONT (Adolphe). Un cas de bouton d'orient à structure de sarcoïde de Boeck. [**Oriental Sore with the Structure of Boeck's Sarcoid.**]—*Ann. de Dermat. et de Syphil.* 1930. May. 7 Ser. Vol. 1. No. 5. pp. 453-461. With 4 figs. [6 refs.]

Examining sections of an excised oriental sore in the pre-ulcerative stage the author was struck by the resemblance to the condition known as the sarcoid of Boeck. The sore examined showed in the deeper parts of the corium circumscribed masses of cells, the majority of which were epitheloid in nature. These masses were separated from one another by unaltered dermal tissue. At one point the epidermis was much reduced in thickness, the cells being separated by exudate in which lymphocytes occurred. The presence of numerous parasites, free in the superficial exudate and intracellular in the deeper parts, and the thinning of the epidermis, evidently a preliminary to ulceration, served to distinguish the condition from that of Boeck.

C. M. W.

NAPIER (L. Everard) & GUPTA (C. R. Das). **A Clinical Study of Post-Kala-Azar Dermal Leishmaniasis.**—*Indian Med. Gaz.* 1930. May. Vol. 65. No. 5. pp. 249-257. With 3 graphs & 10 figs. on 4 plates. [6 refs.] [School of Trop. Med. & Hyg., Calcutta.]

Since the publication of the paper by ACTON and NAPIER in 1927 on 44 cases of post-kala azar dermal leishmaniasis (this *Bulletin*, Vol. 25, p. 70) notes of a further 150 cases have been collected. The present paper is a clinical study of these cases. The condition occurs in all classes of the community, in persons of all ages and both sexes. Though not all give a history of having suffered from kala azar, and some deny having had any illness which might have been this disease, it is concluded that the condition is a sequela of generalized leishmania infection. The dermal lesions usually make their appearance from one to two years after all signs of the visceral infection have disappeared. In no cases have the lesions developed during the primary generalized infection, but in three instances there was a relapse of the visceral disease when the dermal condition developed. The skin eruption appears as depigmented areas, erythema or butterfly rash and nodules. More rarely it is of the verrucose, papillomatous or xanthoma type, while at other times there is a hypertrophy of the lips, eyelids, alae nasi. The depigmented patches, the first lesions to appear, occur on the body or face about one year after the kala azar attack. On the face, but rarely on the body, they pass on to the nodular stage, which is reached about a year later. On the face the erythema may also be regarded as a first stage of the disease. The xanthoma stage would appear to be the final outcome of the condition, but it is rarely seen, and then in cases giving a history of ten to thirty years.

C. M. W.

NAPIER (L. Everard) & HALDAR (K. C.). The Treatment of Post-Kala-Azar Dermal Leishmaniasis.—*Indian Med. Gaz.* 1930. July. Vol. 65. No. 7. pp. 371–375. With 3 text figs. [2 refs.] [School of Trop. Med. & Hyg., Calcutta.]

Of 150 cases of post-kala azar dermal leishmaniasis seen at the Calcutta School of Tropical Medicine between October 1927 and March 1930, 82 attended for treatment. Various treatments, both local and general, were tried, with the result that it was found that the only satisfactory method is the intravenous injection of one of the pentavalent antimony compounds which are efficacious in the treatment of kala azar. In the series reported aminostiburea was employed. The 23 patients who were completely cured received a mean total dose of 5 gm. and a mean number of injections of 26·7 during a mean period of 123·1 days.

C. M. W.

THEODORE (J. H.). Note on a Case of "Dermal Leishmanoid" from Madras.—*Indian Med. Gaz.* 1930. Sept. Vol. 65. No. 9. p. 508. With 2 text figs. [King Inst. of Preventive Med., Guindy.]

The paper describes the first cases of dermal leishmanoid from Madras. A year previously the patient had suffered from a fever diagnosed clinically as typhoid. Whether this was actually kala azar or not cannot be stated, but when seen by the author there was no sign of this disease. Three years before the patient suffered from typhoid, his brother who was living with him was successfully treated for kala azar.

C. M. W.

PHOTINOS (Georg Th.). Die Behandlung der Orientbeule durch lokale Injektionen mit Emetinum hydrochloricum. [Treatment of Oriental Sore by Topical Injections of Emetine.]—*Dermat. Woch.* 1930. Aug. 9. Vol. 91. No. 32. pp. 1219–1223.

The author, who was the first (1918) to treat oriental sore by injections of emetine hydrochloride, states that since his first announcement the method has been adopted in Greece, and particularly in Crete, with the most gratifying results. He describes his technique, which consists in injecting a solution of the drug into the tissue beneath the sore, the needle of the syringe being inserted into the healthy skin and passed through the tissues. The solution is injected, the needle being gradually withdrawn at the same time. If the injection is successful the skin round the sore will become red. If there is not a complete red area surrounding the sore, the injection is repeated at other spots till this condition is attained. The author states that tubes of emetine solution containing from 0·01 to 0·10 cc. can be purchased. [Presumably he refers to a 1 per cent. solution.] The choice of the tube to use depends on the size of the sore or the number when they are multiple. According to the age of the patient the quantity injected at one time varies from 0·01 to 0·12 cc. If the quantity is not sufficient to deal with the whole of a large sore or many sores, then injections are given on successive days, care being taken not to give more than 0·90 to 1·0 gm. of the drug in the entire course. When a cure is not obtained in 15 to 20 days the treatment is repeated. In the majority of cases the injection of 0·01 to 0·05 cc. at one sitting is sufficient.

C. M. W.

ZIEMANN (Hans) & WÄGNER (Alfred). Ueber einen bemerkenswerten Fall von Haut-Leishmaniosis aus Ostafrika. [**A Remarkable Case of Dermal Leishmaniasis from East Africa.**]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1930. July. Vol. 34. No. 7. pp. 345-351. With 7 text figs.

The paper describes a remarkably severe case of cutaneous leishmaniasis in a planter from Portuguese East Africa. In April 1927 the skin on the outer side of the right knee was damaged as a result of a fall into a hole in the ground. In two weeks' time there was suppuration, darkening of the skin and extension of the wound. In spite of treatment the patient became steadily worse till in June 1928, when he returned to Europe, there were large ulcers above and below the knee on the outer side of the right leg, which was considerably atrophied and flexed from the extensive scarring. Treatment was of no avail till at the end of September 1928 leishmania were found at the edge of the ulcers and treatment with stibenyl was instituted. To this drug administered intravenously the patient was peculiarly susceptible, for immediately after the first injection of 0.1 gm. there was discomfort in the throat, vomiting, violent diarrhoea, retention of urine, severe cyanosis and collapse. On the following day albumen and casts were present in the urine. Stibenyl in a dose of 0.01 gm. in 5 cc. of water was then given intramuscularly. The reaction was less severe and it was possible gradually to increase the dose to 0.3 gm. though after each there were cramp-like pains in the leg at the site of injection. The lesions commenced to heal so that at the beginning of December there remained but two small areas still uncovered by skin.

C. M. W.

GASPERINI (Carlo Gasperino). Allergia nel Bottone d'Oriente. [**Allergy in Oriental Sore.**]—*Ann. d'Igiene.* 1930. June. Vol. 40. No. 6. pp. 432-437. With 1 text fig.

A boy 12 years of age contracted oriental sore in Mersina (Asia Minor). There was an ulcer in front of the left ear which finally healed without inconveniencing the patient. Meanwhile another sore in the same position on the other side of the face developed. Though smaller than the first, the second sore produced subjective symptoms of irritation and intolerance which the author attributes to a condition of allergy produced by the first sore.

C. M. W.

GONZALEZ (Hernan E.), ONTANEDA (Luis E.) & VIDAURRETA (Manuel). Leishmaniosis cutánea no ulcerada. [**Non-Ulcerative Dermal Leishmaniasis.**]—*5a Reunión Soc. Argentina Patol. Regional del Norte, Jujuy, 7 al 10 Octubre, 1929.* Vol. 1. pp. 605-613. With 10 figs.

A description of a case of cutaneous leishmaniasis in which there was marked enlargement of the left foot as a result of extensive lesions of the verrucose type. A complete cure resulted from injections of tartar emetic.

C. M. W.

BORZONE (Rodolfo A.). Caso estacionario de leishmaniosis tegumentaria americana observado en Santa Fe. [**Chronic Case of Dermal Leishmaniasis seen at Santa Fé.**]—*5a Reunión Soc. Argentina Patol. Regional del Norte, Jujuy, 7 al 10 Octubre, 1929.* Vol. 1. pp. 600-604. With 6 text figs. [Inst. of Microbiol., Hyg. & Regional Path., Santa Fé.]

The case was one of mucocutaneous leishmaniasis of at least 5 years' duration, during which period the lesions had remained stationary in spite of various treatments. The condition was diagnosed by the discovery of parasites in the lesions of the mucosa and the skin. An emulsion of flagellates

from a culture obtained from the case was killed by exposure to a temperature of 37° C. for two days. This was injected into the skin, where it produced a definite reaction which could not be obtained in a number of other skin diseases employed as controls.

C. M. W.

ARIAS ARANDA (Carlos). Foco familiar de leishmaniosis tegumentaria americana. [**Family Infection of Dermal American Leishmaniasis.**]—*5a Reunión Soc. Argentina Patol. Regional del Norte, Jujuy, 7 al 10 Octubre, 1929.* Vol. 1. pp. 590-594. With 6 text figs.

A record of the almost simultaneous occurrence of three cases of cutaneous leishmaniasis in three members of one family—a woman and her two children. Two of the cases, which were all severe, were completely cured, while the third had considerably improved at the time of writing. The drugs employed were stibenyl, tartar emetic and neosalvarsan.

C. M. W.

CHACON (Arnoldo Lachner). **Leishmania tropica—a Case Report.**—*Eighteenth Ann. Rep. Med. Dept. United Fruit Company, Boston, Mass.* 1929. pp. 175-176. With 1 text fig. [United Fruit Co. Hosp., Limon, Costa Rica.]

The patient, a West Indian negro labourer of Costa Rica, who presented two large ulcers on the face, stated that these had commenced twenty days before as two small abscesses. Leishmania were found in smears and a cure was effected by the use of tartar emetic intravenously and various local applications.

C. M. W.

SILVA (Flaviano). Leishmanioses des organes génitaux. [**Leishmaniasis of the Genitalia.**]—*Ann. Dermat. et Syph.* 1929. Sept. 6th Ser. Vol. 10. No. 9. pp. 965-972. With 2 figs. [32 refs.]

The author describes three cases of South American leishmaniasis in which the penis and scrotum were involved. In one case the patient gave a definite history of the disease having first appeared at a wound in the thigh inflicted by a thorn which was extracted with some difficulty.

C. M. W.

BERNASCONI (Vicente). Leishmaniosis y sífilis. [**Leishmaniasis and Syphilis.**]—*5a Reunión Soc. Argentina Patol. Regional del Norte, Jujuy, 7 al 10 Octubre, 1929.* Vol. 1. pp. 598-599.

The Wassermann reaction according to the techniques of Wassermann, Hecht and Meinicke was tested in fifty-five cases of cutaneous leishmaniasis diagnosed by the discovery of parasites. In 11 cases the reaction was positive with the three techniques and in 18 it was negative. In the others one or other of the techniques gave a negative or doubtful result.

C. M. W.

GUPTA (B. M. Das). **On the Differentiation of *Leishmania tropica* from the Parasite of Dermal Leishmanoid.**—*Indian Jl. Med. Res.* 1930. July. Vol. 18. No. 1. pp. 105-108. With 3 figs. on 1 plate. [6 refs.]

Various tests have been applied by the author to cultures of *Leishmania tropica*, and the *Leishmania* from dermal leishmanoid. Injected

intraperitoneally into mice both strains gave rise to visceral infections, but the one from the oriental sore gave in addition a nodule in the skin at the site of inoculation. On blood agar plates the oriental sore strain did not produce lateral growths as has been described, but was more luxuriant than the other. It was also more resistant to higher temperatures. All these features indicate that the parasite of dermal leishmanoid differs from that of oriental sore.

C. M. W.

SCHÜFFNER (W.). **Kala Azar.**—*Nederl. Tijdschr. v. Geneesk.* 1930. Sept. 27. 74th Year. 2nd Half. No. 39. pp. 4756-4764. With 2 figs. on 1 plate. [3 refs.]

A short account of kala azar and the theories regarding its method of transmission.

C. M. W.

LAZARO CABALLERO (Rudesindo) & PASTOR BOTIJA (Felix). Un caso de kala-azar infantil en la provincia de Huesca. [**Case of Infantile K.A. in the Province of Huesca.**]—*Medicina Países Cálidos.* Madrid. 1930. Sept. Vol. 3. No. 5. pp. 453-455. With 2 text figs. & 3 charts.

A case of kala azar in northern Spain in a child 3 years of age.

C. M. W.

HERRERO RUBIO (Pedro). Sobre un caso de kala-azar infantil. [**Case of Infantile K.A.**]—*Medicina Países Cálidos.* Madrid. 1930. Sept. Vol. 3. No. 5. pp. 456-460. With 2 text figs.

A case of kala azar in a boy 4 years of age at Alicante, Spain.

C. M. W.

LUCCA (Alfredo). Il primo caso accertato di leishmaniosi infantile a Torino. [**First Case of Infantile K.A. diagnosed at Turin.**]—*Pediatria.* 1930. Oct. 15. Vol. 38. No. 20. pp. 1122-1133. [28 refs.] [Inst. of Clin. Pediatrics, Univ., Torino.]

A record of a case of infantile kala azar in Turin. It is described as the first case in this town though the disease was contracted near Cannes.

C. M. W.

MILIO (Giulio). Ricerche sulla velocità di sedimentazione delle emazie nella leishmaniosi e sul comportamento di essa durante la terapia specifica. [**Rate of Sedimentation of Red Cells in Kala Azar.**]—*Pediatria.* 1930. Sept. 1. Vol. 38. No. 17. pp. 937-942. [Inst. of Clin. Pediatrics, Univ., Messina.]

The rate of sedimentation of the red blood corpuscles is increased in kala azar. It is related to the number of corpuscles present in the blood and diminishes as response to specific treatment takes place.

C. M. W.

SEN (Amulya Kumar). **The Value of Eosinophilia in the Treatment of Kala-Azar.**—*Calcutta Med. Jl.* 1930. Oct. Vol. 25. No. 4. pp. 160-166.

The author gives short notes of fifteen cases of kala azar in order to substantiate his claim that cases with an eosinophilia, or those which develop

this condition during the course of antimony treatment, have a better chance of recovery than others.

C. M. W.

CHODUKIN (N. J.). Ueber die Kinder- und Hundeleishmaniosis. [**Leishmaniasis of Child and Dogs.**]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1930. Aug. Vol. 34. No. 8. pp. 423-429. [Uzbekistan San. Bact. Inst., Tashkent.]

This paper appears to be a German summary of papers previously published (see this *Bulletin*, Vol. 27, pp. 98 and 620).

C. M. W.

NUDELMAN (Mauricio). Distribución de algunos casos de leishmaniosis tegumentaria en el Chaco. [**Dermal Leishmaniasis in the Argentine Chaco.**]—*5a Reunión Soc. Argentina Patol. Regional del Norte, Jujuy, 7 al 10 Octubre, 1929.* Vol. 1. pp. 574-589. With 16 text figs.

An illustrated account of 12 cases of cutaneous leishmaniasis seen by the author in the Argentine Chaco.

C. M. W.

MAZZA (Salvador) & LUNA (J. D.). Sobre una forma furunculosa no común de leishmaniosis cutánea en dos niños. [**A Furuncular Form of Dermal Leishmaniasis in Children.**]—*5a Reunión Soc. Argentina Patol. Regional del Norte, Jujuy, 7 al 10 Octubre, 1929.* Vol. 1. pp. 595-597. With 1 text fig.

Two children were brought to hospital with furunculous lesions. On examination of the discharge of pus were found gram positive diplococci together with leishmania.

C. M. W.

SILVA (Flaviano) & DE ARAUJO (Eduardo). Leishmaniose experimental. (Nota prévia.) [**Experimental Leishmaniasis.**]—*Brasil-Médico.* 1930. Sept. 6. Vol. 44. No. 36. pp. 997-999. [13 refs.]

A record of the successful transmission of S. American leishmaniasis to a monkey (*Macacus rhesus*) by intradermic inoculation on the nose. A review of previous records is given.

C. M. W.

GUERRICCHIO (Antonio). Il bottone d'Oriente in provincia di Matera (Basilicata). [**Oriental Sore in Matera (Southern Italy).**]—*Arch. Ital. Sci. Med. Colon.* 1930. Apr. 1. Vol. 11. No. 4. pp. 197-200. With 3 text figs. English summary (3 lines). [Vittorio Emanuele III Hosp., Matera.]

A description of two cases of oriental sore, the first to be recorded from the district of Matera in Southern Italy.

C. M. W.

SARKAR (S. L.). **A Case of Dermal Leishmaniasis mistaken for Leprosy.**—*Indian Med. Gaz.* 1930. Oct. Vol. 65. No. 10. p. 572. With 1 text fig.

An account of a case of nodular post-kala-azar dermal leishmaniasis in a patient who was admitted to hospital on the supposition that he was suffering from leprosy.

C. M. W.

REVIEWS AND NOTICES.

BOYD (Mark F.). **An Introduction to Malariology.**—pp. xiv+437. With 82 figs. (2 coloured). 1930. Cambridge, Mass. Harvard University Press. [25s.]

This work consists, in the main, of notes which the author collected from books and articles dealing with malaria, for the benefit of those attending a course of instruction in Rio de Janeiro during 1925, and it will doubtless prove a valuable book of reference. It has the fault of most compilations that not all the pieces fit into a smooth mosaic, and the reader will often want to ask the author's advice as to which he should choose and which he should discard. It is very difficult to keep a book of this kind up to date: for example, on page 260, it is stated that "All available data on mosquito breeding in saline water were recently reviewed by Balfour," but the review referred to appeared as long ago as 1921. The book deals chiefly with the investigations which should be made before the initiation of schemes for the control of malaria; it is not concerned with the means of preventing it; barely a page is given to drainage, and no reference is made to bonification or Paris green. (*Gambusia* is mentioned on one page, but the reader is left in doubt as to whether it is a plant or an animal, because it is not included in the section on Predaceous Vertebrates.) The identification of anopheline species is not dealt with, and for the systematic study of these the reader is referred to a list of 40 or 50 books and papers on pp. 383-5. The symptoms and treatment of malaria naturally find no place in a work of this nature, but the effect of quinine on the exogenous cycle is discussed; plasmoquine, however, is not mentioned.

The four principal chapters of the book are :—

(1) The Natural History of Malaria. The first half of this deals with man as the source of infection, with his immunity, relapses, and so on. The second half deals with the anopheline vectors—their abundance and their range of flight—and also with the principal factors concerned in the prevalence of malaria.

(2) Malaria Surveys. This is concerned with the epidemiology of malaria. The use of Poisson's formula is explained under the heading of sampling, and a useful table of sampling limits, from PEARL, is included. The various systems of measuring enlarged spleens are discussed; the author considers that CHRISTOPHERS' method is the most accurate, but that it is too elaborate to be useful. Instructions on the making and staining of blood-films are given: it is unlikely that everyone will adopt the use of "a sharp-pointed steel pen, one of the nibs of which is broken off" which is recommended as a convenient lancet for pricking the skin. A business-like and convenient system of card-indexing is described. The data for inquiry are printed on the cards and a hole is punched opposite each positive result.

(3) The Natural History of Anophelines. This deals with the geographical distribution of anophelines, and with their general morphology and ecology.

(4) Anopheline Surveys. This is the most interesting part of the book, probably because it is less of a compilation.

Some of the illustrations, such as that of the stomach of an infected *quadrifasciatus*, are good; others, such as that of its salivary glands, four pages later, are not so good. The printing is excellent.

William Fletcher.

JOHANNESSEN (Fritz) [Dr. Med.]. **Chinin in der Allgemeinpraxis unter Berücksichtigung pharmakologischer Befunde.** [Quinine in General Practice.]—232 pp. With 3 figs. on 2 plates. 1930. Amsterdam-W. Bureau tot Bevordering van het Kinine-Gebruik. [Price not stated.]

This book is issued by the "Bureau tot Bevordering van het Kinine-Gebruik" in Amsterdam. It is an example of the modern elaborate methods of propaganda, in this case on behalf of quinine. At first glance the attention is arrested by the word "Chininum" boldly emblazoned across the red cover; the name of the author is modestly introduced inside. It is essentially a compilation and a painstaking one. The book, as its title states, is intended for medical men in general practice, but the practitioner will miss a judicial summing up of the great mass of evidence collected in support of the use of quinine in a great variety of morbid conditions. The medical man in general practice will wish to know the diseases in which, after full investigation and clinical trial, quinine has been found to be of real use with complete details of the best methods of administration. The arrangement of the subject matter is not very satisfactory; for example, in one part the use of quinine as a hair wash is mentioned, whilst in a different section it is stated that a quinine hair wash produced eczema of the scalp; it would have been convenient for the reader if the two statements had been closely associated.

The therapeutic uses of quinidine are discussed shortly. They are chiefly its application in various morbid conditions of the heart: paroxysmal tachycardia, auricular fibrillation, coronary sclerosis and thrombosis.

A full bibliography and a subject index are given. The names of authors are recorded without initials.

As a fairly complete compilation of the uses of quinine in the treatment of a long list of diseases this book may have its value, but as a practical guide to the medical practitioner its value is somewhat doubtful.

E. D. W. Greig.

HIGOUMENAKIS (Georges) [Chef du service dermatovénérologique à l'hôpital Evangelismos (Athènes)]. **Le bouton d'Orient (leishmaniose cutanée) et son traitement moderne.** [Oriental Sore and its Modern Treatment.] Avec préface du Dr. Milian.—pp. vi+152. With 51 text figs. 1930. Paris: Masson et Cie, 120 Boulevard Saint-Germain. [25 fr.]

The author is chief of the dermatological section of the Evangelismos Hospital at Athens. He is evidently more of a clinician than a parasitologist for though he gives a good general account of oriental sore the value of the book is chiefly on its clinical side. After an historical sketch he describes the distribution and incidence of the disease, the parasite and the histology of the lesions, but when dealing with transmission fails to mention recent work with sandflies and inclines towards the view that the organism is transferred mechanically by house flies and other insects from sores to abrasions and wounds. He discusses the typical sore and the course of its development and continues with an account of 17 atypical forms. This leads him to chapters on prognosis and prophylaxis and finally to one on treatment, the subject with which he is most familiar and which appears to have been the stimulus which led him to write the book. After discussing various methods, including the local injection of emetine, as advocated by his teacher Professor PHOTINOS, he puts them all aside in favour of his own method of diathermy which has given him the best results. This is carried out with high frequency current operating through two electrodes, one a large one applied to the body and the other a small one about the size of a pin's head. The latter, which is the

active electrode, is moved about the surface of the sore and the marginal skin, previously anaesthetized by injection of novocaine, for five minutes till complete coagulation has occurred. On the following day the white coagulum has changed to a black crust. The cure has occurred immediately after the application of current, for live parasites no longer exist. In place of the oriental sore is a wound which heals as rapidly as any aseptic traumatic ulceration. In a final section notes are given of 33 cases, many of them illustrated by excellent photographs and the majority of them treated by the author's method.

C. M. Wenyon.

ROCKEFELLER FOUNDATION. **Annual Report 1929** [MASON (Max), President].—402 pp. With numerous illustrations. New York: 61 Broadway.

In many countries there are rich men who devote part of their wealth to the benefit of their fellow creatures, but there are few whose benefactions reach out over such a world-wide area as do those of the Rockefeller Foundation. It will not be possible, in a short review, to mention all the channels through which help and money flow. Those readers who wish for full details should consult the "Financial Summary" drawn up by the Secretary. It covers nine pages and deals with millions of dollars. Under the head of "Public Health Education" the Report mentions the help which was given to the building of the London School of Hygiene and Tropical Medicine, the annual maintenance of which is provided by the British Government. Institutes of Hygiene have been completed in Prague, Budapest, Angora and at the Peiping Union Medical College, in China, and in connexion with Peiping a health centre has been established at Kiaochow. In the islands of the South Pacific a school has been established for native students at Suva, Fiji. These students will later on be active in public health work. With aid from the "Foundation" an experimental health unit began work on March 1st, 1929, in Mysore, India. These are a few examples of the way in which the Rockefeller Foundation helps to found hospitals and schools of hygiene. Separate sections describe the work done on yellow fever, malaria control work and hookworm surveys in many parts of the world. Every effort is made to educate the people and to introduce good treatment and sanitary appliances, such as suitable latrines in the case of hookworm areas. The "Foundation" provides studentships and fellowships in American and other Universities and helps to make possible interchange of Professors of different countries. It further devotes attention to oriental studies in Baghdad and Jerusalem, to classical studies and has supplied aid to certain scholars in France for the completion of important historical researches. This brief outline may arouse interest in the Report itself. It is well worth reading. The photographs with which the Report is illustrated are very useful and the book contains an excellent index.

J. H. Tull Walsh.

BUCHANAN (R. E.) [Ph.D., Professor of Bacteriology, Iowa State College] & FULMER (Ellis I.) [Ph.D., Professor of Biophysical Chemistry, Iowa State College]. **Physiology and Biochemistry of Bacteria. Volume 2. Effects of Environment upon Micro-Organisms.**—pp. xvii+709. With 57 text figs. 1930. **Volume 3. Effects of Micro-Organisms upon Environment. Fermentative and Other Changes produced.**—pp. xv+575. With 2 text figs. 1930. London: Baillière, Tindall & Cox, 8, Henrietta Street, Covent Garden, W.C.2. [34s. each vol.]

This book is reviewed in *Bulletin of Hygiene*, Vol. 6, p. 119.

BUREAU OF HYGIENE AND TROPICAL DISEASES.

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HELMINTHIASIS.

FAR EASTERN ASSOCIATION OF TROPICAL MEDICINE, TRANSACTIONS OF THE SEVENTH CONGRESS, BRITISH INDIA, 1927. Vol. 3. pp. 196-309. [16 papers on Helminthiasis.]

LABERNADIE reports faecal examinations, presumably by smear, made at Pondichery on 565 persons with these percentages of infection—*Ascaris* 28, *ankylostomes* 21, *trichuris* 26, *strongyloides* 1·5. SIOE has had success with oral adult doses of 0·6 gm. of gentian violet in two *Strongyloides* infections, and relates a third and fatal case, in which other drugs only were given. NAGANO suggests dealing with the prophylaxis of clonorchis by attack upon bythinia on two lines. The first is the systematic removal of water plants on which the spawn is laid, thus enabling fish to reach and devour the young snail spawn; while at the same time brushwood is placed in the water channels, and periodically lifted out and the overlying spawn destroyed. The second is to take advantage of the illness induced in the snails by parasitism. He has found that nine cercariae other than those of *C. sinensis* infest bythinia, and that the effect of parasitism is loss of reproduction—"parasitic castration" he terms it; and he advised that such hyperinfestation should be used to destroy the snails.

KENDRICK reports on two groups, the first 13,303 men, women and children emigrating from India to Ceylon, the second 275 prisoners. The latter were dealt with intensively, egg counts being made by the toll-Tseng technique and reduced to formula of formed stools, and the men treated till D.C.F. detected no eggs a fortnight after the last treatment. In the latter group *ancylostomes* were to *necators* as 5·5 to 94·5. Eighteen deliberate infections were made and weight and haemoglobin recorded. Loss of weight after infection is noted in 15 varying from 2 to 15 lbs. In those of them already treated at the time of report the smallest number of worms recovered was 72 with a loss of weight of 4 lbs., and in the untreated the lowest egg counts were 2,200 per gram and the loss in weight 2 and 5 lbs. respectively. The

percentage losses of haemoglobin in these three men were respectively 10, 10 and 15. For the rest the argument takes mathematical lines, thus, "The regression equation giving the average eggs per gram (x) for persons whose degree of hookworm infestation is known is, in the usual notation:—

$$(x - \text{mean}) = r \frac{\delta x}{\delta y} (y - \text{mean})."$$

And again speaking of the lack of variation in the coefficient of correlation, "This means that when worm-counts are known it is possible, on the average, to estimate the egg-counts and vice versa." [In view of the findings of SARLES (this *Bulletin*, Vol. 27, p. 423) and of HILL (this *Bulletin*, Vol. 24, p. 196) that the egg output varies with the number of worms harboured, the abstractor analysed KENDRICK's figures, given in his Table XIII. In four persons in whom the worms recovered were between 1 and 55 the average egg output per day per female worm was 28,080; in three in whom it lay between that and 155 it was 20,699 per day, and in two in whom it was over 155 the average egg output per female per day was 11,792. In spite then of the striking mathematical formula and the coefficient of correlation there was in fact no parallelism between the average worm count and the average egg count. Relatively the egg count fell as the worm count rose.]

SWEET concludes that the average Ceylonese has an intensity rate of hookworm infection of 2,200 eggs per gram "basis formed faeces," approximately 100 hookworms, that average egg counts in children of 7 to 14 are equal to those of adults, so that it is possible to estimate adult averages by examining school children, and that "but 53 per cent. of the people had what SMILLIE classified as hookworm disease, the remainder being merely carriers of worms." He used Stoll's method and, if it showed no ova, Willis's. Apparently a positive Willis was in these circumstances counted statistically as negative. There were examined 32,507 persons and it is added, with regard to mere positive or negative results by such examinations: "On the basis of these results, the only information obtainable in bulk before the publication of egg-counting methods, the hookworm problem of Ceylon would have been regarded as uniform throughout the island." [It is then interesting to see how the nine provinces arranged themselves: (1) by percentage of positives to these techniques; (2) by number of eggs counted.

(i) Uva; Western; Central; Sabaragamuwa; Southern; Eastern; Northern; North Western; North Central.

(ii) Uva; Western; Central; Southern; Eastern; Sabaragamuwa; Northern; North Western; North Central.

Their order is the same, except that No. 4 in (i) is No. 6 in (ii). Which is correct?]

KORKE, using Stoll's method of counting eggs as a test of the presence or absence of infection, concludes that there is correlation between hookworm prevalence and agricultural and economic conditions, that moisture is important, that a mean of 20 worms represents 1 unit of moisture or soil fertility of the first degree by Brierson-Moore's classification, that those resident on a slope have half the infection of those living on a level surface; so people should be encouraged to defaecate on a dry slope.

THAPAR's report that all dogs he examined were infected with *A. duodenale* is reasonably explained as an error in identification.

FAUST & KELLOGG examined about 500 stools by three smears stained with eosin-iodine. They note:—

- " (1) The small number of species and low incidence of intestinal protozoa.
- " (2) The uniformly heavy infection with *Ascaris* and to a somewhat lesser degree of *Trichuris*.
- " (3) The low (sub-clinical) incidence of hookworm infection in the area, except in the Hak Ka villages near Foochow, where a heavy infection of apparently pure *Ancylostoma duodenale* was encountered.
- " (4) The absence of *Taenia*, *Echinococcus*, *Hymenolepis* and *Dipylidium* infection in the human population; the occasional presence of *Sparganum mansoni* in man and the possibility of human infection with the adult *Diphyllbothrium*, due to the high infectivity of the intermediate hosts commonly consumed as food without sufficient heating.
- " (5) The incidental infection with *Schistosoma japonicum* and *Fasciolopsis buski* in the vicinity of Foochow.
- " (6) The complete absence of *Clonorchis* infection in man and in dogs and its low percentage of infectivity in cats."

From persons spread through the Malay Archipelago BRUG encountered in blood smears a microfilaria which he separated specifically from *Mf. bancrofti* and here designated *Mf. malayai*. In the latter the nerve ring is rather further back, the excretory pore differs little in position, the anal pore and the caudal end of the continuous nuclear column are further forward than in *Mf. bancrofti*. As regards structural differences, the cephalic space is twice as long in *Mf. malayai*, the nuclei form a confused mass. The genital cells G 2, G 3, and G 4 are separated from each other and from the genital pore under vital staining. With haematoxylin the anal pore is a very clear oval gap in the nuclear column for half or the whole of its depth. The tail is a fine thread sometimes swollen at its tip, usually with 2 nuclei, the anterior rounded, the posterior oval or like a point of exclamation. The total length is 187 to 265 μ . The curves are not as a rule long and graceful, and transverse cuticular striation is little marked.

RAO reports on filariasis survey work over a large part of the north and east of India. Among much of local importance the following may be noted. In Cuttack jail the microfilaria rate is 25 per cent., in the town 12; in Calcutta judged by hospital examinations 10. In these places, wild *Culex fatigans* were on the average infected to the extent respectively of 10 and 2.5 per cent. But infection varied with season, the figures being for July 3, August to October 7.5, November–December 12.5. The same held for experimental feeding, the percentage of these mosquitoes which could be infected from infective feeds was in May and June 13, August to October 34, December and January 78. Drug treatment has proved of little value, but intradermal injections of mixed streptococcus-staphylococcus vaccine had checked lymphangitic attacks and reduced oedema.

Clayton Lane.

SHARMA (A. N.). **Helminthic Infections in Shillong.**—*Indian Med. Gaz.* 1930. Apr. Vol. 65. No. 4. pp. 200–203. With 2 text figs.

Stools were examined (1) diluted with normal saline, (2) stained by Gram's iodine method, (3) by D.C.F. Apparently the totals given resulted from a combination of all three. The numbers were 540 and

685 stools from two Gurkha battalions and 503 from civilians. The percentages of infection discovered were :—

	All examined.	Civilians.	Battalion 1.	Battalion 2.
Total infected ...	60.5	64.8	75.7	45.4
Ascaris ...	57.5	60.4	73.3	43.0
Hookworms ...	22.9	31.01	26.6	14.0
Trichuris ...	13.4	17.5	15.0	12.0
Threadworms ...	2.7	4.4	2.4	1.6
Strongyloides ...	5.1	8.3	3.6	3.2
<i>Gastrodiscus hominis</i> ...	3.2	7.3	2.4	0.8
<i>Fasciolopsis buskii</i> ...	2.1	3.9	2.0	1.3

Battalion 1 had been in Shillong about 2 years, Battalion 2 about 6 months. *Gastrodiscus* was recovered from the stools collected after thymol in a large number of the 56 cases in which eggs were found, and *Fasciolopsis buskii* was "quite common." In four cases there were found ova of *Heterodera radiculicola* and in three onchospheres of *Bertiella satyri*, all among civilians. There was one case of *Taenia saginata* in a Gurkha.

C. L.

LABERNADIE (V.) & DEVATA-SOUPRAMANIEN. Les helminthiases à Pondichéry. [**Helminth Infestation at Pondichéry.**]—*Ann. de Méd. et de Pharm. Colon.* 1930. Apr.-May-June. Vol. 26. No. 2. pp. 257-258.

By an unstated method 1,088 stools were examined. The numbers of infections were : ascaris 469, hookworms 367, trichuris 381. In all, 765 stools contained eggs.

C. L.

GAMBIER (A.). Parasitisme intestinal au Cambodge. [**Intestinal Parasites in Cambodia.**]—*Bull. Soc. Path. Exot.* 1930. Oct. 8. Vol. 23. No. 8. pp. 790-792. [1 ref.]

The stools of 700 prisoners were examined by means of two smears; 564 contained parasites : ascaris 310, ankylostomes 229, trichuris 87. *Strongyloides* was reported 4 times, always in multiple infections of which there were 177. Other infections found were giardia 18, *Taenia saginata* 6, *T. solium* 1, enterobius 2. *Balantidium* was absent.

C. L.

SAUTET (J.). Parasitisme intestinal et éosinophilie sanguine chez les Indochinois. [**Intestinal Parasites and Eosinophilia in the Indochinese.**]—*Bull. Soc. Path. Exot.* 1930. Oct. 8. Vol. 23. No. 8. pp. 792-795. [1 ref.]

Sautet examined 55 persons by the method of de Rivas (this *Bulletin*, Vol. 25, p. 447) with these percentage results : Trichuris often present, ascaris less frequently—14.5, ankylostomes 36.3, strongyloides 3.6, *Clonorchis sinensis* 34.5. *F. buskii* eggs were not seen. High eosinophilia was found with low infection. No relation was traced between heavy parasitism and anaemia.

C. L.

GOPSILL (W. L.). **An Investigation of Helminthic Infection in the Lower Shire District.**—*Nyasaland Protectorate Ann. Med. Rep. on Health & San. Condition for Year ending 31st December, 1929.* Appendix III. pp. 43-44.

Smears examined after gravity precipitation for 30 minutes showed eggs of hookworms 74.2 per cent., ascaris 12.2 per cent., *S. mansoni* 20 per cent. and *S. haematobium* 1 per cent. in 500 cases. Other infections such as trichuris or clonorchis were found five times. Ascarids were passed by persons treated for hookworms after no ascaris eggs had been found in the faeces. An attempt is being made to start latrines.

C. L.

i. SCHWETZ (J.) & BAUMANN (H.). Observations helminthologiques sur les noirs de l'âge scolaire dans l'agglomération de Stanleyville (Congo Belge). (Mai 1928-février 1929.) [**Helminths of Native School Children at Stanleyville.**]—*Ann. Soc. Belge de Méd. Trop.* 1929. Dec. 31. Vol. 9. No. 4. pp. 307-317. [Parasit. Lab., Stanleyville.]

ii. — & —. Note sur l'efficacité de la thérapeutique des helminthes courants (ankylostomes et ascaris) dans un milieu très infecté. [**Efficacy of Treatment of Common Helminths.**]—*Ibid.* 1930. Mar. 31. Vol. 10. No. 1. pp. 107-111. [1 ref.] [Parasit. Lab., Stanleyville.]

i. Examination was by a smear of faeces diluted in saline, and it is noted that the figures are only approximate and indeed the result of sheer chance. The number of scholars examined was 952 and 60 per cent. were found infected, the individual percentages being: with ankylostomes 41.4, ascaris 28.2, trichuris 3.2, *S. haematobium* 3.5, *S. mansoni* 1.1, strongyloides 3.6, enterobius 0.2, *T. saginata* 0.1 and flagellates 0.7. It is particularly remarked that eggs are very few when there is intestinal illness.

ii. A further report on 109 pupils of 2 schools. They were treated anthelmintically at the end of 1928, but not examined then. Pupils in these schools (mostly not the same pupils) were examined in October, 1929, and treated with 1 to 3 cc. of carbon tetrachloride if hookworms were present, and with santonin 5 to 15 cgm. if they were not but if other parasites, generally ascaris, were. The children were then re-examined. In the pure ankylostome cases which were detectable by a simple smear, infections fell from 29 to 16, in pure ascaris cases from 14 to 12, in mixtures of the two infections from 14 to 3. Of 5 cases found negative in 1928, 2 were found positive in 1929. In spite of the method of diagnosis used, these are considered as new infections.

C. L.

LE GAC (P.). L'helminthiase chez les Lobis (A. O. F.). [**Helminthiasis among the Lobis (French West Africa).**]—*Bull. Soc. Path. Exot.* 1930. July 9. Vol. 23. No. 7. pp. 727-731.

Le Gac has been unable to avail himself of methods of straining or concentrating faeces and has used two smears from each stool. In these conditions he has discovered in 224 persons 101 with parasites—ankylostomes 67, ascaris 45, strongyloides 4, *Hymenolepis nana* 1. Multiple infections were rare.

C. L.

AGUESSY (Dominique). Parasitisme intestinal dans le cercle de Djougou (Dahomey). [**Intestinal Parasites in Dahomey.**]*—Bull. Soc. Path. Exot.* 1930. Oct. 8. Vol. 23. No. 8. pp. 859-862.

A single diluted smear from each of 950 children's stools obtained at a flat mercenary rate of a sou for every *ex tempore* stool showed 675 or 71.05 per cent. to be parasitized. Detailed percentages were: ankylostomes 69.6, ascaris 12, enterobius 2.2, trichuris 3.3, *S. mansoni* 0.5, *T. solium* 0.4, flagellates 0.19.

C. L.

RANJEVA (J. B.). Parasitisme intestinal à Farafangana. [**Intestinal Parasitism at Farafangana (Madagascar).**]*—Ann. de Méd. et de Pharm. Colon.* 1930. Jan.-Feb.-Mar. Vol. 28. No. 1. pp. 85-89.

Of 560 persons examined by an unstated method, 520 showed in the faeces evidence of parasitism, namely ascaris 272, ankylostomes 3, threadworms 5, trichuris 230, *S. mansoni* 9, *T. solium* 1.

C. L.

SCHAPIRO (Louis) & CORT (W. W.). **A Study of the Relation of the Dry Season to the Level of Helminth Infestation in a Panama Village.***—Amer. Jl. Hyg.* 1930. Nov. Vol. 12. No. 3. pp. 699-708. [12 refs.] [School of Hyg. & Public Health, Johns Hopkins Univ., Baltimore.]

"Examinations by the dilution egg counting method were undertaken in Dolega, Chiriqui Province, Panama, to test the relation of the dry season to the level of helminth infestation. The rainfall of this region is over 100 inches a year and the yards of this village were densely shaded. A preliminary examination of 213 out of a population of 539 showed a very heavy hookworm infestation of the type found in the uplands of Panama, a rather low ascaris count and one of the heaviest trichuris infestations ever recorded by the egg counting method. Two series of counts of 100 individuals were made about two months after the end of the rainy season and two more at about the same period after the end of the dry season. The close correspondence of these check counts indicated that the egg counting technic used was uniform throughout the time of the studies. A comparison of the average of the post-rainy season counts with that of the post-dry season series showed an increase for hookworm, ascaris and trichuris. In all three cases this increase was entirely due to great increases in a very small number of cases (five for hookworm and two each for ascaris and trichuris). The results indicate at least no reduction in the level of infestation for any of the three worms over the four months of the dry season. To what extent this is due to reinfection during the course of the dry season and how much to persistence over this period of worms already present cannot be certainly determined."

[By "the dilution egg counting method" is meant "the small drop and displacement options of the Stoll egg counting method."]

C. L.

OTTO (G. F.) & SPINDLER (L. A.). **Effect of Partial Sanitation on Infestation with Intestinal Parasites in Southwest Virginia.***—Southern Med. Jl.* 1930. June. Vol. 23. No. 6. pp. 556-560. [12 refs.] [School of Hyg. & Public Health, Johns Hopkins Univ., Baltimore.]

The introduction of pit privies "has apparently been effective in reducing the hookworm incidence . . . [but] has apparently done little to control the ascaris burden." This is attributed in part to the fact that small children are too frightened of falling through the hole to use

the pit privy, and adults "feel that it produces an unwise accumulation of odorous and obnoxious waste which if daily dropped in various parts of the yard would be destroyed by insects or chickens and washed into the soil by the rains." The problem is "the slow process of educating these people to consider the sanitary privy as one of the most necessary buildings on the premises of every family." [Evidently these people do not consider a pit privy a sanitary one. Are they blameworthy?]

C. L.

ODESSAER MEDIZINISCHE ZEITSCHRIFT. 1930. Vol. 5. No. 1/2. pp. 1-186. **Fourteen papers on Helminthiasis.** [In Russian script. German summaries.]

In 4,478 persons examined in Odessa, probably by faecal smear, these percentages of infection were found: any parasites 75.9, trichuris 71.5, ascaris 10.9, enterobius 10.4, *Hymenolepis nana* 6.3, hookworms 0.6, tapeworms 0.8. Sex caused no difference. *H. nana* reached its maximum of 12.9 in those from 5 to 10 years old. In children's communities (Kinderstädtchens) the total infection reached 99.5 per cent., that of trichuris being 97.7 and of *H. nana* 18.4. In the red army 57.1 per cent. of 722 persons had intestinal infections established. Rice fields may spread infection. Alterations in the blood are considered. The diagnostic methods of FÜLLEBORN, TELEMANN and the simple faecal smear gave, in the grade of infection actually present, positive percentages of 75, 52 and 8 respectively. Enterobius infected persons had eggs under the finger nails to the extent of 87.8 per cent.; the disabilities caused by the infection are indicated. In saturated salt solution and collection by Fülleborn's method, hymenolepis and trichuris eggs sink after some days, ascaris eggs may be found 6 to 12 hours after an initial failure to do so, and float for months. Enterobius eggs have all sunk in 72 hours. The periphery of the surface should be examined rather than the centre.

C. L.

- i. SMIRNOW (G. G.). Der Infektionsgrad der einheimischen und fremden Bevölkerung von Tadshikistan mit parasitischen Würmern nach den Angaben der helmintho-koprologischen Untersuchung in der Stadt Duschambe im Jahre 1928. [**Helminth Parasites of Population of Tadshikistan.**—In "Die tierischen Parasiten und einige parasitäre Krankheiten des Menschen in Tadshikistan" [PAWLOWSKY (E. N.), Edit.], Leningrad. 1929. pp. 143-162. With 21 text figs. [21 refs.] [In Russian. German summary p. 163.]
- ii. PARADOKSOW (L. F.). Zur Frage ueber die Echinococcuskrankheit bei der Bevölkerung von Tadshikistan.—*Ibid.* pp. 163-167. [7 refs.] [In Russian. German summary p. 167.]
- iii. PAWLOWSKY (E. N.). Die Bedeutung der durch Eingeweidewürmer hervorgerufenen Invasionen überhaupt und der Verbreitungswege derselben im Zusammenhang mit der Lebensweise der Tadshiken.—*Ibid.* pp. 168-185. With 1 text fig. & 4 plates. [27 refs.] [In Russian. German summary p. 185.]

i. Of 408 persons whose faeces were examined by a method unstated in the summary, infection percentages in Dushambe and in Tadshikistan were respectively: for trichuris 43.87 and 62.4, ascaris 18.38 and 27.51, enterobius 3.67 and 1.93, hymenolepis 4 and 0.77, and *T. saginata* 1.33 and 0.38.

- ii. Of 1,651 inmates of the Dushambe hospital hydatid occurred in 5.
- iii. These conditions are attributed to impure water, primitive latrines, fouling of the soil, the proximity of latrines to vegetable gardens, primitive cooking arrangements, and other habits.

C. L.

- i. SCHJENTI (A.). Ankylostomidosis in Mingrelien, Gurien und Imeretien (nach den Ergebnissen der Expedition vom Jahre 1928). [**Ankylostomiasis in Georgia.**]—*Nachrichten der tropischen Medizin*. Tiflis. 1930. May-June. Vol. 3. No. 1. pp. 41-52. [In Georgian script. German summary pp. 97-98.]
- ii. JANKOSCHWILI (W.) & KARIBOW (N.). Die Rolle der roh genossenen Gemuese in der Verbreitung der Helminthiasis zwischen der Bevoelkerung der St. Tiflis. [**The Rôle of Raw Vegetables in the Spread of Helminthiasis at Tiflis.**]—*Ibid.* pp. 53-59. [4 refs.] [In Georgian script. German summary p. 98.]
- iii. SWANIDSE (D.). Ueber die Verbreitung der *Hymenolepis nana* und *Hymenolepis diminuta* unter den Kindern der Tifliser Kindergaerten. [**The Spread of *H. nana* and *H. diminuta* among Children in Tiflis Schools.**]—*Ibid.* pp. 60-68. [In Georgian script. German summary p. 99.]

i. Three districts in West Georgia were examined in 1928 with this result. In Mingrelien 15 villages, 1,528 persons, maximum hookworm infections per village 76·8, minimum 14·7, average 65·35. In Gurien the figures are 10, 1,416, 50, 24·1, 41·51; and in Imeretien 7, 1,076, 90, 80·1, 83·6. Haemoglobin in infected persons varied from 11 to 80, average 45. Geophagy was considerable. The diagnostic method is unnoted in the summary.

ii. There were investigated 11,665 grams of vegetables with recovery of 282 worm eggs, 111 being those of man's parasites, 141 worm larvae, 326 insects in imago, larva or egg. Of the 111 worm eggs 100 were enterobius, 7 ascaris, 2 hookworm, 1 trichuris, and 1 taenia onchosphere.

iii. The investigation covered 1,300 children between 2 and 8 years, 87 per cent. being positive to eggs of parasites in the faeces. Detailed percentages are: trichuris 78, ascaris 41·3, *H. nana* 14·1, *E. vermicularis* 3·6. Actual figures for others are: hookworms 6, trichostrongyles 6, *H. diminuta* 4, *Taenia saginata* 2. The method of diagnosis is unnoted in the summary.

C. L.

- HAKKI (Ismail). Ueber Darmparasiten in der Türkei. [**Intestinal Parasites in Turkey.**]—*Zent. f. Bakt.* I. Abt. Orig. 1930. May 15. Vol. 116. No. 6/8. pp. 516-518.

The numbers examined were 600, the technique smears plain and stained. The numbers of infections were: ascaris 223, trichuris 101, hymenolepis 53, "necator" 2, enterobius 41, diphyllbothrium 6, *T. saginata* 1, dipylidium 1. The percentages of protozoa found were *E. histolytica* 3·8, four-celled amoebic cysts 8·2, giardia 4·0, tetramitus 2·0, trichomonas 3·9. Coccidia, balantidia and spirochaetes were not found.

C. L.

HALL (Maurice C.). **Arthropods as Intermediate Hosts of Helminths.**—*Smithsonian Miscellaneous Collections.* 1929. Sept. 25. Vol. 81. No. 15. 77 pp.

Hall has here produced a valuable catalogue of the insects implicated in the literature as secondary hosts to cestodes, trematodes, nematodes and acanthocephalids, with the object of aiding the student and encouraging co-operation between helminthologists and entomologists.
C. L.

HALL (Maurice C.). **Treatment for Infestations of Man with Parasitic Worms.**—*U.S. Nav. Med. Bull.* 1930. July. Vol. 28. No. 3. pp. 553-569.

Of this lecture given at the Naval Medical School, Hall said: "It must be kept in mind that some things which may be said may be true and yet may call for an extended discussion . . . to prevent them being misunderstood or giving the effect of a half truth." An abstract of such a paper must be unsatisfactory. For ascaris oil of chenopodium in adult dose of 1 cc. is advised. As purgative Hall prefers castor oil, never less than one ounce, but if salts are given not a saturated but a third-saturated solution. After 4 hours there must be a second aperient—salts—if the bowels have not acted, to be repeated if necessary four hours later with an enema. Santonin, gr. v, with an equal quantity of calomel should be substituted for chenopodium if there is gastro-enteritis, debility, fever, or pregnancy.

For hookworms carbon tetrachloride in dose of 3 cc. with a saline, avoiding alcohol, fat and meat, the contra-indications being alcoholism, gross ascariasis and a low ionized blood calcium content. Tetrachlorethylene in doses of 3 to 4 cc. is mentioned. Chenopodium of fixed ascaridole content is advised in doses of 2 cc., but the dose of ascaridole aimed at is not disclosed.

For hookworms and ascaris in mixed infections a dose of 3 cc. of 1 part of chenopodium to 2 or 3 of carbon tetrachloride or tetrachlorethylene.

For trichuris 30 cc. of leche de higueron once or for 3 successive days followed by a saline, or santonin as for ascaris. For threadworms it is believed that the relatively insoluble tetrachlorethylene will prove valuable. For tapeworms pelletierin, carbon tetrachloride or male fern. For filariae no treatment is established, for dracunculus a pound of sugar a day or 4 increasing doses of novarsenobenzol have been advised. For schistosomes the usual tartar emetic or emetine. For fasciolopsis carbon tetrachloride or 4 gm. of B-naphthol, remembering its risks. For strongyloides, trichinosis, clonorchis, paragonimus and somatic taeniasis no drugs are definitely beneficial.

C. L.

- i. DA COSTA (S. F. Gomes). Action de l'acide oxyacétylaminophénylarsinique sur l'*Ascaris lumbricoides* du porc. [**Action of Organic Arsenicals on Various Helminths.**]—*C.R. Soc. Biol.* 1930. Feb. 7. Vol. 103. No. 5. pp. 339-342. With 2 text figs. [5 refs.]
- ii. ——. Action de l'acide oxyacétylaminophénylarsinique sur *Taenia serrata* et les Ankylostomides du chien.—*Ibid.* pp. 342-344. With 2 text figs. [1 ref.]

- iii. DA COSTA (S. F. Gomes). Action des arsénobenzènes sur les helminthes de l'intestin.—*Ibid.* 1930. May 1. Vol. 103. No. 14. pp. 1257-1259. With 1 text fig. [1 ref.]
- iv. ——. Action anti-helminthique des dérivés de l'acide oxyacétylaminophénylarsinique et des arsénobenzènes, obtenus par injection intraveineuse de ces composés.—*Ibid.* pp. 1260-1261. [1 ref.]
- v. ——. Action de l'acide oxyacétylaminophénylarsinique et des arsénobenzènes sur les helminthiases des chiens.—*Ibid.* pp. 1262-1263.

This work forms an interesting addition to the evidence that certain anthelmintics are in themselves inactive, but become effective after the host has altered them into something else. The worms were tested in a Rhode-Saito solution, modified or unmodified.

i. *Ascaris lumbricoides* from the pig was quite unaffected by a 10 per cent. solution of stovarsol or spirocid, in striking opposition to reports which have been published as to its anthelmintic value. Muscular tissue of worms was equally undisturbed by the gastro-intestinal contents of fasting dogs. When, however, the test took place in a solution of this salt in this same gastro-intestinal fluid, or in this fluid obtained from dogs who had been given 1 gram of stovarsol by mouth an hour earlier, there occurred marked, often immediate, paralysis. Moreover, the blood from the animals fed previously with stovarsol was also active against ascaris. On the other hand mixtures of stovarsol with pepsin, trypsin, faeces, bile, or liver did not give corresponding results.

ii. This drug produced in a 1 per cent. solution a gradual temporary cessation of movement in *T. serrata*; the intestinal fluid of dogs fed an hour earlier with 1 gm. of stovarsol produced definite paralysis in 15 to 45 minutes after an initial stimulation. On *Uncinaria stenocephala* the unaltered drug was inactive. The intestinal contents an hour after taking 1 gm. of the drug produced a lessening of muscular contraction, but to obtain a result as effective as on taenia it had to be given in double or treble the strength.

iii. Arsenobenzol and novarsenobenzol in 0.4 per cent. solution in Rhode-Saito fluid are inactive against ascaris and *T. serrata*, but if the intestinal contents of dogs treated by mouth an hour earlier with one of these drugs are mixed with Rhode-Saito fluid and placed in the thermostat for 3-18 hours at 37° C., the mixture immediately paralyzes ascaris and produces lessening of the contractions of the taenia. The conclusion is that these compounds become anthelmintic only after being transformed in the gastro-intestinal tube.

iv. By injecting stovarsol or neosalvarsan intravenously into dogs it was found that after an interval of 60 to 90 minutes for the latter and 90 to 120 minutes for the former the blood becomes very active against ascaris and less so against *T. serrata*, the activity being lost after some hours. It is concluded that the anthelmintic product does not represent the final change produced in the circulation on the organic arsenicals; but no evidence is offered as to whether they have not meanwhile been excreted by kidney or bowel.

v. As regards anthelmintic effect of these drugs as checked by autopsy, the heads of *T. serrata* have never been expelled; on ascaris the

effects have been greatest with novarsenobenzol, namely 65 per cent., the other drugs being active in this order, stovarsol, spirocid, arsenobenzol.

C. L.

NAG (S. C.). **Notes on the Use of Carbon Tetrachloride.**—*Indian Med. Gaz.* 1929. Dec. Vol. 64. No. 12. p. 683. [Barbheel Tea Estate Hosp., Bargang P.O., Tezpur, Assam.]

The drug was obtained from Merck & Co. The dose was minims 60 [4 cc.] for an adult given fasting, followed by magnesium sulphate $\frac{1}{2}$ to 1 oz. [16 to 32 gm.] half to one hour later. In children it was minims x at 1 year old with minims ii added for each year. [2 cc. for a child of 11.] In Series 1 comprising 342 adults, 5 females showed 2 to 4 hours after administration slight fever, vomiting, coated tongue, restlessness, jaundice, very high coloured and scanty urine, giddiness and sometimes slight delirium. One passed roundworms and after 4 days incessant vomiting was given oil of chenopodium and a purge and recovered, whether with further passage of ascarids or not is unstated. Series 2 comprised 289 children between 3 and 11 years of age. Four had symptoms resembling the above, but urine was actually suppressed in 2. Three died. No post-mortem examinations were permitted. [Nag has courageously published his cases, a contrast to the silence which hid the earlier Assam deaths.]

C. L.

OKANO (Masatoshi). Studien ueber die Schädigung der Leberfunktion durch Tetrachlorkohlenstoff. [**Injury to Liver Function by Carbon Tetrachloride.**]—*Japan Jl. Med. Sci. IV. Pharmacol.* 1930. Mar. Vol. 4. No. 2. pp. 167–188. [63 refs.] [Pharmacol. Inst., Imperial Univ., Tokyo.]

The experimental animals were rabbits, the doses very large—0.1 to 1.4 cc. corresponding to about 12 to 42 cc. for a man of 70 kilos. Many died in 2 to 4 days. There was a trace of albumin after 1 to 2 days and an increase of serum esterase* which fell to normal in 4 to 7 days. Total nitrogen and ammonia in the urine were increased, the latter parallel with the serum esterase. The amount of urea and allantoin in the urine was lessened, that of amino acid is increased. The effects were the same in fed and starving dogs, and the blood sugar fell in both. Injection of 1.5 to 2 gm. of glucose per kilo did not protect the liver against central fatty degeneration of a high grade. Necrotic change was found in the kidneys also.

C. L.

SHARP (Elwood A.). **The Relation of Toxicity to Dosage of Tetrachlorethylene (C_2Cl_4).**—*Jl. Trop. Med. & Hyg.* 1930. Nov. 15. Vol. 23. No. 22. pp. 336–339. [16 refs.] [Dept. of Exper. Med., Parke, Davis & Co., Detroit.]

The literature is surveyed, and short notes given regarding 96 patients under 3 different medical men. One who treated 21 patients recorded

* Esterase is an enzyme which hydrolyses an ester, splitting it up into the parent alcohol and acid.

untoward phenomena in 11. The other medical men recorded only 4 between them. It is suggested that if the drug is absorbed at all, its low toxicity produces only a fleeting and innocuous intoxication in a few hypersensitive persons [see however KENDRICK, this *Bulletin*, Vol. 27, p. 420] and that higher single doses are possible. Of the 11 patients who were re-examined by an unstated diagnostic technique from 5 days to 3 weeks after treatment three were still positive.

C. L.

ZSCHUCKE (Johannes). Therapeutische Versuche mit Ascaridol. [Treatment Experiments with Ascaridole.]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1930. Sept. Vol. 34. No. 9. pp. 472-480. [23 refs.]

The vermicial effect of ascaridole was determined (1) by giving ascaridole, and later some other vermifuge repeated as often as four times till no more worms were passed, since Zschucke has found that using Willis's direct gravity flotation method he could not be sure that no eggs meant no worms, (2) by counting by Stoll's method the number of eggs before and 12 days after treatment, it being explained that it is used not because it is better than D.C.F. but because it is more fashionable. Apart from the vermicial effect judged by the number of worms, the vermitoxic effect was measured—that is to say the extent to which counts soon after treatment fail to show eggs when they or worms are afterwards passed. Ascaridole followed by a saline was given (Ia) to 12 cases once, generally in doses of 0.9 gm. for a man of 60 kilos., (Ib) to 11 cases in the same individual doses but given twice, (Ic) to 6 cases in an average dose of 1 gm. per 60 kilos. In a second series there was administered castor oil with 2.5 per cent. of ascaridole; the dosage of the latter lay between 0.0161 and 0.0213 gm. per kilo, the average (and usual) quantity being 0.018 gm. given once (IIa) or twice (IIb). [The gram and the cc. are practically identical for ascaridole.] The effects for hookworm and ascaris are given in the table:

			Vermicial Effect (worm counts).	Vermicial and Toxic Effect (egg counts).	Cured.
1. Hookworm :					
Series Ia	...	...	70% (12 cases)	* 86% (12 cases)	17%
Series Ib	...	...	81% (11 cases)	97% (11 cases)	36%
Series Ic	...	...	56% (6 cases)	93% (6 cases)	17%
2. Ascaris :					
Series Ia	...	...	62% (10 cases)	69% (9 cases)	20%
Series Ib	...	...	81% (9 cases)	86% (9 cases)	56%
Series Ic...	...	...	63% (5 cases)	83% (5 cases)	80%

			Vermicidal Effect (worm counts).	Vermicidal and Toxic Effect (egg counts).	Cured.
1. Hookworm :					
Series IIa	...	...	91% (14 cases)	89% (13 cases)	54%
Series IIb	...	...	98.4% (8 cases)	89% (7 cases)	86%
2. Ascaris :					
Series IIa	...	...	98% (12 cases)	100% (12 cases)	92%
Series IIb	...	...	97% (8 cases)	100% (8 cases)	88%

No toxic effects were noted. After one dose of ascaridole the proportion of males to females expelled was 1 to 5.3, of those remaining 1 to 2.5; after two doses 1 to 8 and 1 to 2.3.

C. L.

HASSAN (A.) & EL DIN (M. Salah). **Investigations on the Oil of Chenopodium and its Anthelmintic Action.**—*Jl. Egyptian Med. Assoc.* 1930. July. Vol. 13. No. 7. pp. 271-281. [8 refs.] [Public Health Labs., Cairo.]

The work confirms that of SMILLIE and PESSOA, of PAGET, and of KNAFELLENZ and HOFMANN that ascaridole is the active and toxic principle of oil of chenopodium and that Paget's method of measuring its amount in the oil is satisfactory.

C. L.

SCHWARTZ (A.), AZAM (A.) & YOVANOVITCH (M.). Le traitement des parasitoses intestinales par le benzo-méta-crésol. [**Treatment of Intestinal Helminth Infestations by Benzometacresol.**]—*Presse Méd.* 1930. Apr. 9. Vol. 38. No. 29. pp. 485-486.

The authors state that chemically pure benzo-metacresol is absolutely harmless but a powerful anthelmintic in adult doses of 4 to 5 grams given on 4 or 5 consecutive days, and that several such courses are required to remove any parasites present. No details are given.

C. L.

DA COSTA (S. F. GOMES). Sur l'action anti-helminthique de la gomme-gutte. [**Anthelmintic Action of Gamboge.**]—*C.R. Soc. Biol.* 1930. Feb. 7. Vol. 103. No. 5. pp. 345-347. With 3 text figs.

The gum resin of *Garcinia* species, whose active principle is gambogic acid, a drastic purge, produces only a slight paresis in *A. lumbricoides* in a strength of 5 per mille. In *Taenia serrata* there is paralysis in 10-20 minutes, following a phase of excitation. On *U. stenocephala* the effect is slight.

C. L.

CAWSTON (F. G.). **Toxic Reactions in Antimony Therapy.** [Correspondence.]—*Jl. Med. Assoc. South Africa.* 1930. Oct. 11. Vol. 4. No. 19. p. 607. [2 refs.]

"Not only to avoid inconvenience to young patients, but in order to prevent the occurrence of hepatitis, every effort should be made to avoid both coughing and vomiting by skilful regulation of the doses employed in the treatment of bilharzia disease."

C. L.

SENEVET (G.) & CHAMPAGNE (R.). A propos d'un cas de distomatose à *Fasciola hepatica*. [**Case of *F. hepatica* Infestation.**]—*Arch. Inst. Pasteur d'Algérie.* 1929. June. Vol. 7. No. 2. pp. 207-216. [2 refs.] [Pasteur Inst. of Algeria, Algiers.]

The authors collect from the literature 103 cases in which *F. hepatica* was found in man, and gave in a certain number of them the references.

Yet another case is added; it showed abdominal, especially hepatic, pain, urticaria, eosinophilia of 30 per cent. and yellowish operculated eggs in the stool averaging 137 μ by 80 μ as well as those of trichuris. The liver was enlarged but not tender, and at one time the man became subicteric. Thymol, 2 gm., expelled no worms, nor did male fern. A course of stovarsol in increasing doses from 0.25 gm. to 1 gm. relieved symptoms and lessened eggs, but did not disinfect.

There have now been six cases of this infection reported from Algeria, four within the last six years, so that the infection is probably commoner than is generally suspected.

C. L.

GIORDANO (Mario) & GELLI (Giuseppe). Contributo allo studio della distomatosi epatica nell'uomo. (Prima osservazione in Italia di distomatosi da *Fasciola hepatica*.) [**Case of *Fasciola* Infestation in Man.**]—*Arch. Ital. Sci. Med. Colon.* 1930. Jan. 1. Vol. 11. No. 1. pp. 5-10. With 1 text fig. [28 refs.] English summary (8 lines) p. 11. [Inst. of Colonial Path., & Inst. of Clin. Pediatrics, Univ., Bologna.]

"A description of the first case in Italy of infection caused by *Fasciola hepatica* in human beings. The patient was a girl of 11 years of age taken into hospital suffering from anaemia and decline. The examination of faeces showed the presence of the eggs of *F. hepatica*, from which, when placed in water, a miracidium escaped. The patient lived in the country in the Prov. of Bologna, a locality where distomatosis is widely diffused among animals. A repeated treatment of Male Fern caused the eggs to diminish gradually and produced an improvement in the general condition of the patient."

C. L.

SCRIABINE (K. I.), PODYAPOLSKAYA (B. P.) & STATIROVA (N. A.). [Contribution à la caractéristique de la fasciolopsiose de l'intestin et sur son agent pathogène.] [**Fasciolopsis Infection.**]—*Russian Jl. Trop. Med.* 1929. Vol. 7. No. 4. pp. 262-278. With 3 figs. on 2 plates & 1 text fig. [29 refs.] [In Russian.]

A case of infection with *Fasciolopsis buskii* is described and the opportunity is taken to discuss the status of other species of this genus. The patient, a Chinese girl 6 years old, had been resident in Moscow for about half a year when her condition was recognized at the Tropical

Institute. According to the parents, the child while in China suffered from pains in the abdomen and chronic diarrhoea since the age of two. She was treated with thymol followed by sodium sulphate, and about 200 specimens of *F. buskii* were discharged with the faeces. The freshly isolated parasites were flesh-coloured and had the appearance of bits of raw meat. After remaining for some time in water or in 70 per cent. alcohol they became decolorized. Unfixed fresh specimens measured 34–38 mm. by 18–20 mm. In specimens fixed in alcohol and compressed, the measurements were 32–56 mm. by 15–22 mm. The stools contained numerous eggs which had a superficial resemblance to those of *Fasciola hepatica*. They were of a uniform light-grey colour and varied considerably in size and in shape (0.1296–0.2112 by 0.072–0.0912 mm.). Attention is drawn to a new distinctive character in the eggs of *F. buskii*: on the pole opposite to the operculum there is a small thickening of the membrane which is either median or asymmetrical; this structure is said to be homologous to the processes on eggs of other trematodes.

The authors discuss the systematic position of other species of *Fasciolopsis* and conclude that *F. rathouisi* and *F. fülleborni* are identical with *F. buskii*, while the question of *F. goddardi* and *F. spinifera* is left open. A critical review is given of the case of *F. buskii* infection recorded by SEMIONOW and GARMOTTY (this *Bulletin*, Vol. 24, 1927, p. 982); the authors believe that the parasite was *Fasciola hepatica*. The present case is therefore the first to be recorded in Russia, though the infection was probably contracted in China. The paper has some excellent figures of the anatomy of the worm (fig. 1), of specimens deformed by thymol (fig. 2), and illustrating variations in the eggs (fig. 3).

C. A. Hoare.

MINAMI (Seigo) & SATO (Takashi). Hautgeschwülste durch Lungen-distoma (*Paragonimus westermani*). [Skin Tumours caused by *Paragonimus*.]—*Arb. a. d. Med. Univ. Okayama*. 1930. Aug. Vol. 2. No. 1. pp. 78–88. With 6 text figs. [Skin Clinic, Univ., Okayama.]

Two children of 7 were given raw juice of the crab, *Potamon dehaanii*, a domestic remedy for whooping cough and intermediate host of *P. westermanii*. Bloody sputum followed and thoracic swelling from which paragonimus adults were recovered. The flukes so removed had reached the deep dermis or the subcutaneous tissue.

C. L.

NISHIYAMA (Iori). [Study of a Lung Fluke (*Distoma pulmonale*) found among School Children in Shizuoka Prefecture and of its Intermediate Host.]—*Jl. Public Health Assoc. Japan*. 1929. July. Vol. 5. No. 7. [In Japanese. English summary pp. 3–4.]

This Japanese prefecture is large and only those with a history of spitting of blood "were examined of their sputa and stools, and as the result out of 80,144 persons 953 were found to be suffering from the disease." About 53.5 per cent. spat blood for 3 days only; 3.6 per cent. did so for more than 3 years. When the sputum contained blood ova were always found; when it was transparent this was so in 3.9 per cent. only. Lung symptoms in positive cases were very slight, and insufficient for diagnosis. Tuberculosis is not mentioned in the abstract.

C. L.

GOODWIN (T. S.). *Paragonimus westermanii* Infection. Case Report.—*China Med. Jl.* 1930. June. Vol. 44. No. 6. p. 568.

"A case of Paragonimiasis is reported, in which the signs and symptoms disappeared almost immediately on pushing the administration of emetine to the limit of tolerance."

C. L.

KHAW (O. K.). Remarks on the Species of *Paragonimus*, with Special Reference to the Questions of their Identity and Distribution.—*Nat. Med. Jl. China.* 1930. Feb. Vol. 16. No. 1. pp. 93-102. With 2 text figs. [37 refs.] [Union Med. College, Peking.]

A valuable survey of the literature.

C. L.

OCHI (Sigeru). Experimentelle Untersuchungen ueber die Widerstandsfähigkeit der encystierten Cercarien von *Heterophyes heterophyes*. [Resistance of the Encysted Cercariae of *H. heterophyes*.]—*Okayama-Igakkai-Zasshi* (Zent. d. Okayama Med. Gesellsch.). 1930. Mar. Vol. 42. No. 3. pp. 617-626. [13 refs.] [In Japanese. German summary p. 627.] [Inst. for Ship & Trop. Diseases, Kobe.]

Encysted cercariae live for 13 hours in *soja* sauce, 24 hours in vinegar, 48 hours in *miso*, 36 hours in sour *miso*, and 4 days in 5 per cent. salt solution. A 10 per cent. salt solution kills in 4 days and a saturated salt solution in 2. Infectivity is lost if the fish is plunged in boiling water for 20 seconds, in water at 80° C. for 3 minutes, or at 50° C. for 7 minutes; but remains after the fish has been iced for 8 days. Cercariae isolated from the fish remain alive from 3 to 7 days in fresh water, from 4 to 7 days in sea water, and after 18 hours in active gastric juice.

C. L.

TAKAHASHI (Shozo). On the Life-History of *Metagonimus yokogawai*, a New Species of *Metagonimus* and *Exorchis major*.—*Okayama-Igakkai-Zasshi* (Zent. d. Okayama Med. Gesellsch.). 1929. Dec. Vol. 42. No. 12. pp. 2687-2753. With 58 figs. on 9 plates. [44 refs.] [In Japanese. English summary pp. 2754-2755.] [Bact. Dept., Med. Univ., Okayama.]

SUZUKI having held that the accepted species *Metagonimus yokogawai* really contains a second species having large eggs, Takahashi working under his guidance has divided cercariae found in the liver of *Thara* (*Melania*) *libertina* into three species. One encysts readily in the fins [and] scales of *Plecoglossus altivelis* and develops into *M. yokogawai*. The second encysts readily in the gold fish, *Carassius auratus*, and becomes the adult worm of the "large egg type of *Metagonimus*" which is held to differ from other species of the genus by the close approximation of the posterior ends of the vitellaria and by the larger eggs which average 0.033 by 0.021 mm.; but it is not named in the summary. The third encysts in *Carassius auratus* and develops into *Exorchis major*.

C. L.

- i. KHALIL (M.). The Rôle of the Nile in the Dissemination of Snail Intermediate Hosts of Schistosomiasis in Egypt.—*Jl. Egyptian Med. Assoc.* 1930. Apr. Vol. 13. No. 4. pp. 137-143. [7 refs.] [Research Section, Public Health Offices, Cairo.]
- ii. ——. Discussion on the Nile as a Source of Bilharzia in Egypt, at the 2nd Annual Congress of the Egyptian Medical Association held at Alexandria on 21st May 1929.—*Ibid.* pp. 144-145.
 - i. The investigation starts from certain statements for which LEIPER'S authority is quoted.

" Leiper in 1918 claimed that the main source of Bilharzia infection is the small canals and drains where the snails abound. The Nile may be a source of infection by infected water passing into it from drains and canal escapes in Upper Egypt. . . .

" In 1929, in his official Report on Bilharziasis submitted to the Egyptian Government he again insisted on the freedom of the large canals and the Nile from the snail carriers of Bilharziasis and he further claimed that the few snails found in them have migrated backwards from the small tertiary canals against the current. The importance of this statement will be appreciated from the recommendation that all measures of prevention of Bilharzia directed against the Molluscan host will be confined to the tertiary canals and drains only. The Nile and the large canals are considered safe according to this opinion."

Khalil states confidently that in 1928 all *Bullinus* snails were " completely exterminated " in the isolated irrigation region of Warden, comprising 600 acres on the west of the Delta, by making of the entering water a solution of copper sulphate of the strength of 1 in 200,000. A few months later *Bullinus* snails were again present, some being also found on weeds caught by the pillars of a wooden bridge at the entrance of the canal. This possibility of re-establishment of snails from the Nile, then apparently realized, led to the discovery that 25 per cent. of children who had never left the island of Roda (in which there are no canals or drains and which lies in the Nile opposite Cairo) were infected with *S. haematobium*, while living *Bullinus* were found on its shores. Next it is claimed as being established by survey that no drains or tributaries enter the Nile south of the Assuan dam, while traps in the shape of boxes attached to buoys south of the dam collected *Bullinus contortus* and its eggs. Planorbis was not found in these traps, nor was it present in the Warden region. Accordingly it is concluded that *Bullinus* snails reach Egypt from the south, where they can easily be found along the banks during low Nile (April to June) and that with the advent of the flood they are carried into and restock the tertiary canals and drains.

ii. These " recent researches . . . condemn [Professor LEIPER'S] view as hypothetical and wrong " and " destroy the foundation upon which Prof. LEIPER based his hypothesis of combating the snails."

[By courtesy of Professor LEIPER a duplicated copy of his report mentioned has been consulted. The apposite passages are these :

" The Cairo Waterworks Company owns two separate systems, both pumping water from the eastern bank of the Nile by intakes only a few hundred yards apart. One supply provides Cairo with unfiltered water, and is linked with the sedimentation tanks of the old water works of Abbassia, which now act as balancing tanks to maintain a flow in the pipes when the pumps are not working. The other supplies the sedimentation tanks of Rod-el-Farag which provide the filtered water to Cairo. An examination of the latter sedimentation tanks which had been thoroughly cleared out three or four months previously, after the Nile flood, revealed the presence of a few large living *Bullinus* snails on the sieves guarding the exit from these tanks to the pumps. This paucity of snails was confirmed by an examination of the bottom of the tank, which the Manager of the Cairo Waterworks kindly emptied at my request. A similar examination of the tanks providing the unfiltered supply gave a very different result. Vast numbers of relatively small *Bullinus* snails were found all over the muddy bottoms, and empty *Bullinus* shells of all sizes were found in deposits of over one foot in thickness. The only explanation for this extraordinary contrast would appear to be that the snails in very small numbers enter the system from the Nile, and the conditions in the

shallow Abbassia tanks are favourable for breeding, while those in the deep and more frequently cleaned Rod-el-Farag tanks are unfavourable. No molluscs were found during a similar inspection of the sedimentation tanks of the Giza Waterworks on the opposite side of the river."

"The snails occurring in the Cairo Waterworks may have been derived from water entering the Nile a few miles south by the canal escape on the eastern bank, for, on tracing this channel through Maadi, I found, at low water, a considerable number of empty *Bullinus* shells on its banks. This canal derives from the Nile near Wasta, but in its lower reaches acts as a drain."

"During January, when certain of the main canals carrying water from the Nile to Lower Egypt were empty, an examination of their muddy banks failed to disclose *Bilharzia*-carrier snails, except in the neighbourhood of the openings of small irrigation canals. Further investigations are required to determine whether there is not an *upward* migration from the smaller into the larger canals at certain times of the year."

LEIPER, then, points out that certain facts can be reasonably explained only by concluding that the Nile can and does spread snails. His conclusions fall in with those of FAIRLEY and BAHR in 1920:

"During the spring months of the year the sluice gates are open and the Nile water is coursing through the canals of Lower Egypt bearing with it large masses of fresh water weed and vegetation and it is to this that most of the infested snails can be found clinging."*

Again: "An annual migration of infected snails from various centres takes place. Such centres are Cairo, Zag-a-zig, Ismailia, etc., and these towns act as foci in the distribution of bilharziasis to Egypt."†

and these writers suggest that it might be possible to intercept this distribution of infected snails by some device on the lock gates. LEIPER also points out in the criticized report that a *Bullinus*-infected drain does in fact enter the Nile, not merely north of Assuan dam, but shortly above the Cairo waterworks. It is further the case that in the report LEIPER advances no hypothesis, and makes no recommendation that any particular prophylactic line should be followed; but urges that "appropriate experiment and trial must clear up certain doubtful matters before any sound general line of action can be formulated"; one questionable point being whether it is not possible for snails of the dangerous species to pass upstream from the smaller canals at certain seasons, as indeed other species of snails are known to do.]

C. L.

ONSY (Anis.). **Egyptian Splenomegaly caused by Bilharzial Infection.**—*Jl. Egyptian Med. Assoc.* 1930. Mar. Vol. 13. No. 3. pp. 69-72. With 4 coloured plates (issued as supplement in the April 1930 issue).

Bilharzia ova can be shown in certain enlarged spleens by macerating the tissue in 20 per cent. caustic soda and centrifuging the resulting fluid. Yet in most of the spleens so examined no ova were found, and this, it is held, is due to their phagocytosis by giant cells, a condition accompanied by a considerable eosinophilia. This activity finally transforms the splenic pulp into inactive fibrous tissue with a steadily decreasing eosinophilia. In the absence of schistosome ova from these

* Observations on Bilharziasis amongst the Egyptian Expeditionary Force.—*Parasitology*. Vol. 12, p. 65.

† Observations on Egyptian Bilharziasis. Part I. Commonwealth of Australia, Department of Defence. Melbourne.

later cases this conclusion is of course a matter of inference. [Yet it may be that ova were present in some of these negative spleens, for a 20 per cent. caustic soda solution is a strong solvent of chitinoid, and may have destroyed eggs.]

C. L.

BONNIN (Henri). Les splénomégaties d'Égypte. La spléno-mégatie bilharzienne. [**Egyptian Splenomegalies.**—*Rev. Prat. Malad. des Pays Chauds.* 1929. Dec. Vol. 9. No. 12. pp. 557-558, 561-568, 571-578, 581-586. [68 refs.]

A consideration of the literature leads to the conclusion that while many of these splenomegalies are bilharzial in origin, it cannot at present be accepted that all are so.

C. L.

PETER (F. M.). Die Bekämpfung der Bilharzia in Ägypten. [**Anti-Schistosomiasis Measures in Egypt.**—*Beihefte z. Arch. f. Schiffs- u. Trop.-Hyg.* 1929. Vol. 33. No. 3. pp. 153-163 (237-247). [22 refs.]

After a historical survey and the statement that a campaign may be directed either against snails or against the parasite in man, there are considered 80 cases treated by fouadin, a neo-antimosan in which sodium is substituted for potassium. All but 5 were completely cured to the microscope. The great majority were infected by *S. haematobium*, and the treatment was by 9 or 10 intramuscular injections totalling about 0.4 gm. of antimony. Of the total quantity of the metal 50 per cent. was excreted in the urine and 4 per cent. in the faeces, while some was reported as stored in the alimentary canal, liver, spleen, kidney and heart. By X-ray photographs it could not be detected at the site of injection for more than 5 or 10 minutes.

C. L.

CHARLIER (M.) & CHARLIER-COLLON (N.). Contribution à l'étude du *Schistosoma haematobium* au Congo. [**Study of *S. haematobium* Infestation in Belgian Congo.**—*Ann. Soc. Belge de Méd. Trop.* 1930. Sept. 30. Vol. 10. No. 3. pp. 325-339. [25 refs.]

In 41 children, examined because they had haematuria, the eggs of *S. haematobium* were found in the faeces as well as the urine in 19. No adults suffered in this way. Of these 41 the stools showed infections in the following numbers: *S. haematobium* 19, hookworms 2, strongyloides 16, diphyllbothrium 4, taenia 10, ascaris 6, enterobius 3, entamoebae 4. The spleen was enlarged in 20 and eosinophilia averaged 26 per cent. (18.7 to 45.9). This intestinal habitat gave rise to no intestinal symptoms of any sort. Treatment by tartar emetic, 0.02 gm. per dose to a total of 0.5 gm., cured all but 5. No disagreeable symptoms followed except cough in three. The 5 uncured were given antimosan (Heydon 661) intravenously every other day in increasing doses beginning with 0.03 gm. reaching 0.1 and amounting to 1 gm. in all. This cured all without intercurrent malarial relapses.

C. L.

GOPSILL (W. L.). **Some Notes upon Schistosomiasis in the Lower Shire District of Nyasaland.**—*Nyasaland Protectorate Ann. Med. Rep. on Health & San. Condition for Year ending 31st December, 1929.* Appendix II. p. 42.

In the centrifuged urine of 100 adults giving no history of haematuria, admitted to Port Herald hospital, *S. haematobium* eggs were found. The only snail in which forked-tailed cercariae were detected was *Melanoides tuberculata* identified at the British Museum, and 50 to 60 per cent. of 500 specimens taken from the Shire River in February to June and October to December were so infected. In July, August and September no new bilharzia cases, rectal or vesical, came for treatment, nor could *M. tuberculata* be found in the river or its dried up bed even when dug into freely with the incitement of reward. "From these observations it would appear that the mollusc *Melanoides tuberculata* is the only snail host of either *S. mansoni* and/or *S. haematobium* in the Lower Shire District."

C. L.

CARROSSE (J.). La bilharziose vésicale dans le sud marocain (*Schistosoma haematobium*). [**Bladder Schistosomiasis in S. Morocco.**]—*Ann. Parasit. Humaine et Comparée.* 1930. Mar. 1. Vol. 8. No. 2. pp. 161–164. [5 refs.]

The author discusses 210 cases of schistosomiasis. The implicated snail is *Bullinus contortus* at Marakesh, and it has shown infection with furcocercariae to the extent of 5 or 6 per cent. *Planorbis metidjensis*, the intermediate host in Portugal, is quite numerous but has not been implicated here. Further local investigations are suggested.

C. L.

ZAVATTARI (Edoardo). Le schistosomiasi in Cirenaica. [**Schistosomiasis in Cyrenaica.**]—*Boll. Soc. Med.-Chirurg. di Pavia.* 1930. Vol. 8. No. 3. 28 pp. With 5 text figs. [29 refs.] [Inst. of Comp. Anat. & Physiol., Univ., Pavia.]

Zavattari reports 14 cases of vesical schistosomiasis acquired, it may be safely concluded, about Derna where *Bullinus contortus* is present, and 1 case of intestinal schistosomiasis which is not believed to have been autochthonous. *Planorbis numidicus* is present in certain parts of Tunis, and the distribution of *B. contortus* seems very local.

C. L.

ADVIER (M.). Les bilharzioses à Saïgon. [**Schistosomiasis at Saigon.**]—*Rev. Prat. Malad. des Pays Chauds.* 1930. Jan. Vol. 10. No. 1. pp. 18, 21–23.

Examination of men of two military units showed 145 infected with schistosomes, mostly *S. mansoni*, all having acquired infection before reaching Saigon. Most of these men were living out of barracks alongside dirty ponds in which children played and which contained *Planorbis* and *Bullinus* species. Yet examination of 1,255 Annamite tirailleurs and 350 children disclosed no autochthonous infection, so that some undiscovered factor is evidently at work in preventing it. Treatment of 33 persons with subcutaneous injections of emetine, 0.08 to 0.12 gm.

on each of ten consecutive days, has caused disappearance of eggs, but these have invariably reappeared.

C. L.

CARROSSE (J.). A propos de l'observation de Dimitracof, Foyers européens de bilharziose vésicale; Enquête en Provence. [**European Foci of Vesical Schistosomiasis.**—*Bull. Soc. Path. Exot.* 1930. July 9. Vol. 23. No. 7. pp. 731-736. [12 refs.]

In Provence *Bullinus contortus* and *Planorbis metidjensis* are unknown. *P. corneus*, *P. carinatus* and *P. complanatus* are abundant. There is no indigenous schistosomiasis, but it should not be concluded that it cannot be established. [DIMITRACOFF described a case of schistosomiasis in a man who had never been out of Europe (this *Bulletin*, Vol. 22, p. 465)].

C. L.

BRUMPT (E.). La ponte des schistosomes. [**Oviposition in Schistosomes.**—*Ann. Parasit. Humaine et Comparée.* 1930. July 1. Vol. 8. No. 3-4. pp. 263-297. With 13 text figs. & 12 figs. on 6 plates. [41 refs.] [Parasit. Lab., Faculty of Med., Paris.]

After noting the work and conclusions of others, Brumpt describes his own which cover *S. haematobium*, *S. mansoni* and *S. bovis* fresh or in organs, and *S. spindalis* and *S. japonicum* preserved. He points out how different is the habitat of these worms in experimental animals from that in their normal hosts, a difference which suggests different external stimuli, physical and chemical. That on which he lays stress in directing them to small veins is the contact with the surrounding walls which gives them a sense of security and well being. The female generally remains within the male, and when ovipositing her eggs are laid not in batches but one by one. Thus in 94 female *S. bovis* the uterus was found empty in 3 only; moreover the same female lays eggs at the same stage of development (the miracidia being formed later as they lie in the tissues), and yet they are found in masses in capillaries with freshly laid and miracidium-containing eggs freely mixed. Brumpt concludes that worms live in the submucosa and that eggs laid there are forced into capillaries partly by the *vis a tergo* of those subsequently posited, partly by a force pump action in which the male hunches himself up, temporarily fills the blood vessel, and produces a reversed blood flow accentuated by the intestinal movements of the host. Egg masses lying in capillaries are manifestly not grasped by their walls, there is plenty of room for blood to circulate round them, so it is suggested that they are kept in position in these vessels by something adhesive, perhaps inflammatory. Certainly the spine is held to have no action in this direction, and it is pointed out that *S. japonicum* has none to function in this manner. Nor is the spine held to function in piercing and allowing escape from the vessels, since the egg of *S. bovis* may leave them sharp end first or blunt end first. Escape may be due to vascular rupture or to the leucocytes which surround the eggs and cling to their shells, perforate the capillary wall and destroy its canalization. They may then perhaps reach the surface and escape, or be destroyed in pseudotubercles leaving no trace except for débris of their shells.

C. L.

SOROUR (M. F.). **Bilharziosis of the Blood-Vessels.**—*Proc. Roy. Soc. Med.* 1930. July. Vol. 23. No. 9. pp. 1369-1370 (Sect. Trop. Dis. & Parasit. pp. 25-26).

The paper deals with the lesions produced in the non-capillary blood vessels themselves as the result of schistosome infection. The portal vein has been found in no respect altered in structure. Visceral veins often show organized thrombosis with canalization near parts inhabited by worms. Round a dead worm endothelial proliferation occurs. An ovum is described as exciting endothelial proliferation round it and subendothelial proliferation where the spine enters the vascular coat, the latter lesion being described as exactly similar to that of syphilis and producing atheroma and calcification; [no mention of the exclusion of concurrent syphilis is made]. In the muscular coat an egg produces a "bilharzioma" of endothelial cells, later forming a concentrically fibrosed swelling likened to a healed saccular aneurism. Toxins are held to be the cause of endotheliomatous bladder growths.

C. L.

SOROUR (M. F.). **The Significance of the Polymorphonuclear Eosinophile Cell and the Association of Bilharziosis and Tuberculosis.**—*Jl. Egyptian Med. Assoc.* 1930. Mar. Vol. 13. No. 3. pp. 73-79. With 6 figs. on 3 plates. [Path. Dept., Egyptian Univ., Cairo.]

Sorour's thesis is that tuberculosis and schistosomiasis are each common causes of death, but that the association of the two diseases in one person is, comparatively speaking, exceedingly rare. The same holds for association of tubercle with another disease also producing high eosinophilia, namely ankylostomiasis. Two cases are cited in which cure of schistosomiasis was followed by active tuberculosis. When tuberculous and bilharzial lesions lie contiguously the tubercular lesions are encapsuled in dense fibrous tissue. It is suggested that high eosinophilia induced by these helminthic infections is antagonistic to the tubercle bacillus and the matter is being investigated.

C. L.

TSYKALAS & RIEGL (R.). Diagnostik latenter Bilharzioseaffektionen durch Reaktivierung. [**Diagnosis of Latent Schistosomiasis by Reactivation.**]—*Ztschr. f. Urol. Chirurg.* 1929. July 9. Vol. 27. No. 4-6. pp. 433-437. [17 refs.]

The method advised for making evident a latent schistosome infection is to inject 0.05 gm. to 0.1 gm. of emetine [$\frac{1}{4}$ to 1 $\frac{1}{2}$ grains], and 4 to 6 hours later to look for and expect to find an appearance of blood and eggs in the urine in cases where none were detected before. The authors find themselves in disagreement with KHALIL's statement that emetine is a haemostatic in schistosomiasis.

C. L.

CHRISTOPHERSON (J. B.). **Bilharzia Disease in Children.**—*Proc. Roy. Soc. Med.* 1930. Oct. Vol. 23. No. 12. pp. 1733-1743 (Sect. Trop. Dis. & Parasit. pp. 43-53). With 4 text figs. [10 refs.]

Christopherson showed a series of photographs illustrative of the point that schistosomiasis is essentially a children's disease, the disastrous

and terrible complications so common in adult Egyptians being the result of constant infections added from childhood onwards; for the parasites are clearly long lived, living ova having been passed for at least 28 years after all possibility of reinfection has ceased. So that although three-quarters of a million persons are treated annually in Egypt, the most potent source of infection, the child, is generally neglected, and no obvious impression has been made on the disease. Two cases of failure of treatment in European children are recorded, failure because it had to be stopped owing to the appearance of allergic symptoms possibly due to the largely protein diet of the race. Moreover in adults there may be on the night of the injection excruciating muscular pains and a temporary paralysis, partial or complete. These symptoms are reminiscent of the shock-like collapse caused by histamine in experimental animals and are perhaps due to a toxic histamine-like body in the liver. Although antimony, it is taught, is contra-indicated in cardiac and renal disease, hepatic disease is not mentioned in this connexion. Yet antimony belongs to the phosphorus-arsenic chemical group and these are hepatic toxins; in rabbits killed with antimony tartrate the main damage found is in the liver cells; jaundice and bilious vomiting occur in a proportion of cases. The drug is contra-indicated when cirrhosis of liver with ascites occurs in *S. mansoni* infection, nor do like cases in *S. japonicum* infection do well. So it is asked "Does the antimony produce a hepatic toxin lethal to parasites which in larger quantities is toxic to the human organism?" And it is added "The dose required to kill the parasite in children comes very near to the largest dose tolerated by the liver cell."

In discussion N. Hamilton FAIRLEY referred to a patient who after about 9 "grams of antimony" became gravely ill with collapse and diarrhoea, and two days later severe jaundice appeared with bile salts and pigments in the urine. "Undoubtedly the pathology of this condition was a toxic necrosis of the liver due to antimony administration."

["gms." and "grs.," and again "grams" and "grains," are readily confused by the printer and, as this instance shows, overlooked by the type reader. The symbol "g." can be mistaken for or confused with no other abbreviation and in the abstractor's view is the only admissible abbreviation of "gramme."]

C. L.

MÖLLER (H. R.) & STENDER (A.) Bilharziose des Rückenmarkes unter dem Bilde einer Myelitis dorsolumbalis transversa completa. [**Schistosomiasis of the Spinal Cord simulating Myelitis.**]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1930. Oct. Vol. 34. No. 10. pp. 527-538. With 8 text figs. [12 refs.] [Nerve Clinic, Univ., Hamburg-Eppendorf.]

In this remarkable case a man who had had urinary disease in Brazil diagnosed without microscopic examination as gonorrhoea developed six months later and in a single night a hemiplegia from which he died with a stinking urine and which was referred to a lesion about the second and third dorsal vertebrae. Lesions of a pyelocystitis appeared at autopsy but there seemed no reason to keep any organs except brain and cord. Microscopic examination showed plentiful pseudotubercles in the cord centred on eggs of *Schistosoma mansoni*, a fact established when the evidently puzzled authors consulted FÜLLEBORN. Although TSUNODA and SCHIMAMURA found eggs of *S. japonicum* in the brain in 1906, and FERGUSON those of *S. haematobium* in brain and cord in 1913, this is believed to be the first

instance in which *S. mansoni* has been so involved ; and in view of the value of treatment the need for exclusion of these infections in nervous disorders occurring in endemic countries is pointed out.

C. L.

GORDON (R. M.) & HICKS (E. P.). '**Fouadin**' and '**Auremetine**' in the Treatment of *S. haematobium* Infections amongst West African Children ; together with Observations on the After-Results of Treatment with Emetine Periodide and Emetine Hydrochloride.—*Ann. Trop. Med. & Parasit.* 1930. Oct. 22. Vol. 24. No. 3. pp. 443-447. [1 ref.] [Sir Alfred Lewis Jones Research Lab., Freetown, Sierra Leone.]

Six severely infected children were treated with fouadin in the prescribed dosage. Live ova disappeared from the urine in 8 to 22 days. The table records examinations up to 26 days after beginning treatment. Five of them lost 1 to 3 lbs. in weight. "In one instance (Case No. 1) persistent vomiting, lasting four days, occurred, and it was not considered advisable to continue the course." The table shows the course in this case, a boy of ten, as lasting to the eighteenth day and comprising 29 cc. of the drug ; and in that of another boy, also of 10, as lasting the same time with administration of 28 cc. Considerable local pain accompanied the bulky intramuscular injections. Auremetine was given by mouth to one case. Live ova were not found on the last day of treatment nor two days later. Of fourteen patients who had been treated four years earlier with emetine (this *Bulletin*, Vol. 24, p. 178), nine were now found infected on re-examination, namely 5 of 8 treated with the hydrochloride, and 4 of 7 with the periodide.

C. L.

STAUDT. Note au sujet du traitement de la schistosomiase. [**Treatment of Schistosomiasis.**]—*Bull. Méd. du Katanga.* 1930. Vol. 7. No. 2. pp. 35-41.

Staudt's findings are these : Stibenyl and neostibosan were inactive. Stibyl cured 2 of 3. Antimosan well tolerated, active, requiring further study. Tartar emetic, no result except vomiting with tablets a year old given by mouth ; some improvement with fresh tablets. Intravenous tartar emetic, cured all of 9 young persons ; emetine injections, 7 cures in 9 ; alternation of the last two drugs, 5 cures in 5 cases.

C. L.

i. CAWSTON (F. G.). **A Consideration of Some Cases of Bilharzia Disease treated with Preparations of Antimony other than Tartar Emetic.**—*Jl. Trop. Med. & Hyg.* 1930. Nov. 1. Vol. 33. No. 21. pp. 317-318. [5 refs.]

ii. ORENSTEIN (A. J.). [**Treatment of Schistosomiasis.**] [Correspondence.]—*Ibid.* 1931. Jan. 15. Vol. 34. No. 2. p. 32.

i. "Fouadin was widely advertised. . . . It was claimed that the drug was free from . . . undesirable toxic effects. . . . The claim was even published that three injections might effect a cure. Indications of severe hepatitis following the use of fouadin, even where there was no question as to the stability of the supply, were allowed to pass unheeded. . . . Due consideration of the pathological condition of the bilharzia patient forces one to the conclusion that the use of fouadin in these patients frequently

results in severe hepatitis, a complication which is greatly to be feared in persons whose liver function is already impaired through the presence of schistosome invasion."

On veterinary experience of antimosan intramuscularly for nagana, it is held to promise well in schistosomiasis.

ii. Orenstein, as one who drew the attention of South African practitioners to foudain and as a member of the Transvaal Bilharzia Committee, asks Cawston to substantiate his statement that the drug frequently causes severe hepatitis, to give a detailed description of the pathological condition of these patients, and to state his reasons for concluding that foudain is more deleterious than tartar emetic. Veterinary experience with antimosan Orenstein holds to favour its use. He has experience of some 200 cases of intravenous and intramuscular injection with foudain, and apparent cure in each case.

C. L.

BRUMPT (E.). Localisation vésicale expérimentale d'oeufs de *Schistosoma mansoni* chez une souris. Localisations vésicales à *S. mansoni* et rectales à *S. haematobium* chez l'homme. [Localization of Ova of *S. mansoni* and *S. haematobium*.]—*Ann. Parasit. Humaine et Comparée*. 1930. July 1. Vol. 8. No. 3/4. pp. 298–308. With 2 text figs. [42 refs.] [Parasit. Lab., Faculty of Med., Paris.]

Brumpt collects the literature noting the cases, since 1884, where eggs of *S. mansoni* have been found in the urine and, since 1914, where those of *S. haematobium* have been found in the faeces. He reports too that among 10 mice infected with *S. haematobium*, 72 with *S. mansoni*, and 58 with *S. bovis*, eggs were found in the bladder once only—in an infection with *S. mansoni*—and in that instance miracidia were not present in these eggs although they were in others contained in the intestine of the same mouse.

C. L.

CAWSTON (F. G.). Schistosome resembling *S. japonicum* in South Africa.—*Jl. Trop. Med. & Hyg.* 1930. Oct. 1. Vol. 33. No. 19. p. 292. [1 ref.]

Norman WALKER has seen in faeces in Durban an ovum resembling that of *S. japonicum* and Annie PORTER has found in *Limnaea natalensis* a cercaria identical with *S. japonicum*.

C. L.

SOROUR (M. F.). Peritoneale und subperitoneale Bilharziasis. [Peritoneal and Subperitoneal Schistosomiasis.]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1930. Nov. Vol. 34. No. 11. pp. 577–581. With 5 text figs.

Sorour lays stress on the well known lesions which occur in and under the peritoneum, pseudotubercles surrounding eggs, which may have the structure of a typical endothelioma.

C. L.

ABBATUCCI (S.). La prophylaxie de la bilharziose. [The Prevention of Schistosomiasis.]—*Rev. Prat. Malad. des Pays Chauds*. 1930. Jan. Vol. 10. No. 1. pp. 24, 27–30. [4 refs.]

A useful summary of existing knowledge regarding treatment and the destruction of snails.

C. L.

LEGER (Marcel). La bilharziose intestinale. Schistosomiasiques et schistosomés dans les colonies françaises. [**Rectal Schistosomiasis in the French Colonies.**—*Rev. Prat. Malad. des Pays Chauds.* 1930. May. Vol. 10. No. 5. pp. 201-206, 209-216, 219-222, 225-230, 233-239. [3 pages of refs.]

After a wide survey of the literature the author stresses the importance of establishing for each French colony the snails which are the local intermediate hosts of *S. mansoni*. Further there must be special conditions which make an infected person a carrier or a sick man. Why also does *S. mansoni* never result in the urinary passage of eggs in the Antilles and Madagascar where it is the only blood fluke, but does so in the French West African colonies? Why does *S. haematobium* produce in certain countries intestinal bilharziasis almost exclusively? Is there only one species with a particular taxis dependent on the mollusc through which it has passed?

C. L.

MAASS (E.) & VOGEL (H.). Beobachtungen ueber Schistosomiasis mansoni in Französisch-Guinea und Liberia. [**Schistosomiasis Mansoni in French Guinea and Liberia.**—*Arch. f. Schiffs- u. Trop.-Hyg.* 1930. Oct. Vol. 34. No. 10. pp. 564-566.

Maass is of the Mission Hospital, Bolahun, Liberia. Eggs of *S. mansoni* have been found in 3 persons coming from a spot in Liberia 100 km. east of the station, and in those coming from 32 villages in French Guinea. One of these villages, Tomassadou-Digbo, was investigated. As most do, it lies on a hill with a stream running round its base in which *Planorbis choanomphalus* was found, identified by DEGNER of the Hamburg Zoological Museum. Half these snails contained a furcocercous cercaria, which penetrated human skin. Examination without attempted concentration showed that, of 25 stools lying about, 15 contained eggs of *S. mansoni*. The water of the stream is used for washing, drinking and irrigating rice, and close to its edge on the rice farm faeces are deposited which must readily be washed into the water with rain.

C. L.

SCHWETZ (J.) & BAUMANN (H.). Note sur la bilharziose intestinale de la région de Stanleyville. [**Intestinal Schistosomiasis in the Stanleyville District.**—*Rev. Méd. et Hyg. Trop.* 1930. May-June. Vol. 22. No. 3. pp. 138-141. [7 refs.] [Parasit. Lab., Stanleyville.]

Reverting to their previous report [see above p. 173], on stool examination of 955 [?952] children they found ova of *S. mansoni* 12 times (9 boys, 3 girls) and *S. haematobium* 33 times (19 boys, 14 girls). In 361 soldiers, stool examinations showed eggs of *S. mansoni* 12 times and *S. haematobium* 4 times, one of the 15 cases having both eggs. They note that the findings confirm CHESTERMAN's, that in this region *S. haematobium* is more often the cause of intestinal schistosome infection than is *S. mansoni*.

C. L.

GIRGES (Rameses). **The Prognosis of Schistosomiasis Mansoni.**—*Jl. Trop. Med. & Hyg.* 1930. Mar. 1. Vol. 33. No. 5. pp. 65–68.

In prognosis most depends on early treatment. If early the organs may completely recover; if late, recovery is only partial. Return to work is the rule, but reinfection after cure is generally attended by very severe symptoms and should be avoided by removal from the endemic area if this is in any way possible. Cases with enlarged liver may live indefinitely; if there is ascites life usually ends within two years; if the heart is dilated death may occur suddenly at any time. The parasites are held to live 10, or even 25 years.

C. L.

GIRGES (Rameses). **The Treatment of Schistosomiasis Mansoni, both Medical and Surgical.**—*Jl. Trop. Med. & Hyg.* 1930. Feb. 15. Vol. 33. No. 4. pp. 49–55. With 5 charts & 3 figs. [12 refs.]

The limits of medical treatment have been noted [this *Bulletin*, Vol. 27, p. 462]. Rectal papillomata may be dealt with in mild cases by removal after dilatation of the sphincter. In prolapse cases there are mentioned zinc chloride, the cautery, excision of strips of mucosa, or resection. In the hepatic type good results are claimed from splenectomy.

C. L.

GAMBIER. Bilharziose intestinale observée chez un soldat antillais n'étant pas retourné dans son pays d'origine depuis plusieurs années. [**Schistosomiasis Mansoni in a West Indian Soldier in Indo-China.**]—*Bull. Soc. Méd.-Chirurg. Indochine.* 1930. May. Vol. 8. No. 5. pp. 437–438.

Eggs of *S. mansoni* were found in Indochina in 1929 in a man who had left the Antilles in 1916. The other localities mentioned as those in which he had since lived were Salonica and Indochina. He had had no intestinal illness till his present one, which suggested amoebic dysentery.

C. L.

i. LE ROUX (P. L.). **Notes on the Life-Cycle of *Schistosoma mattheei* and Observations on the Control and Eradication of Schistosomiasis in Man and Animals.**—*15th Ann. Rep. Director of Vet. Services, Union of South Africa.* 1929. Oct. Vol. 1. (Sections I to IV.) pp. 407–438. With 5 plates. [9 pages of refs.]

ii. SUAREZ (Ramon M.). **Schistosomiasis of the Lungs simulating Bronchial Asthma.**—*Bol. Asoc. Med. de Puerto Rico.* 1930. Mar. & Apr. Vol. 21. No. 176. pp. 40–46.

i. In an immediately preceding paper in this Report VEGLIA and LE ROUX had described a sheep schistosome with terminal spined eggs and named it *S. mattheei*. In this paper Le Roux considers the distribution in the sheep's body, the migration of the adults and eggs in its vessels and tissues, the pathological lesions caused by animal schistosomes and by *S. mattheei* in particular in the small intestine, liver, pancreas, spleen, lungs and lymph glands, in all of which organs adults have been found. In the lungs there is constant and conspicuous pigmentation and a fairly constant presence of pseudotubercles. "The comparative absence (according to the literature) of lung lesions in man must be attributed to the lack of looking for them."

ii. Suarez described a boy of 16 with very troublesome cough, and râles and rhonchi in his chest, with no expectoration, with an eosinophilia of 74 per cent., with a few ova of *S. mansoni* in the stools, and with a positive reaction to intradermal injection of saline but not of alcoholic extract of the liver of infected snails. The literature is reviewed and the comment made: "So we have seen that most authors do mention lung pathology and speak of the frequency of bronchitis associated with or preceding the intestinal or dysenteriform symptoms of schistosomiasis.

[FAIRLEY and MACKIE (below) point out that G. A. TURNER (*Jl. Trop. Med. & Hyg.*, 1909, Vol. 12, p. 35) found in South Africa that 64 per cent. of 28 cases dying of pulmonary complaints showed in their lungs ova of *S. haematobium*, while in 11 dying of other complaints the percentage was 33.]*

C. L.

FAIRLEY (N. Hamilton), MACKIE (F. P.) & JASUDASAN (F.). **Studies in *Schistosoma spindale*.**—*Indian Med. Res. Memoirs. Supplementary Series to Indian Jl. Med. Res.* 1930. Sept. Memoir No. 17. 180 pp. With 18 graphs, 2 colour plates & 82 figs. on 17 plates. [90 refs.] [Haffkine Inst., Bombay.]

- i. **The Infective Rate, Seasonal Incidence and Source of Supply of Infected Molluscs.** [FAIRLEY & JASUDASAN.] pp. 1-10. With 2 graphs in text & 4 figs. on 2 plates. [14 refs.]

Since cercariae of any mammalian schistosome act with antibody called forth by any adult mammalian schistosome, alcohol-soluble extracts for diagnostic use in complement fixation tests can be made from the fresh livers of snails parasitized by cercariae of any such species. But an alcoholic extract of any tissue may in sufficient concentration act as a Wassermann antigen. Accordingly it is necessary to have as much cercaria and as little liver as possible—to have heavily infected livers, which are recognized by being enlarged, friable and yellowish. In Salsette, Bombay, *Planorbis exustus* has been found in maximum infection of 9.9 per cent. with *S. spindale*; in El Marg, Egypt, *P. boissyi* in 54 per cent. with *S. mansoni*. Egypt then offers great facilities for the making of diagnostic bilharzia antigen from naturally infected snails.

- ii. **The Definitive Hosts of *S. spindale* with Special Reference to Alimentary Infection in Ruminants.** [FAIRLEY & JASUDASAN.] pp. 11-15. [7 refs.]

Goats, cattle and water buffaloes are naturally infected with *S. spindale*. Goats may be artificially infected through the mouth where

* Professor Leiper has kindly furnished the following additional references :

- BELLELI (V.). Les oeufs de Bilharzia haematobia dans les poumons.—*Unione med. egiz.* Alessandria. 1884-5. Vol. 1. No. 22-23. pp. 1-3.
 BOWLEY (A. A.). Specimens of the *Distoma haematobium* (*Bilharzia haematobia*) with the Urinary Organs and Lung containing Ova.—*Trans. Path. Soc. London.* 1890-1891. Vol. 42. pp. 194-195.
 SYMMERS (W. St. Clair). A Note on a Case of Bilharzial Worms in the Pulmonary Blood in a Case of Bilharzial Colitis.—*Lancet.* 1905. Jan. 7. p. 22.
 see SHIESS-Bey in BIRCH-HIRSCHFELD (F. V.). *Lehrbuch der pathologischen Anatomie.* 4. Aufl. Vol. 1. Allgemeine pathologische Anatomie. p. 303. Abbildungen von Eiern in Lungengewebe.

penetration of cercariae into the tongue is pictured; and after conveyance of cercariae by tube into the alkaline stomach, probably the rumen, infection may be heavy. Oral infection in achlorhydric conditions in man has not hitherto been adequately considered as a definite risk.

iii. **The Experimental Pathology in the Goat with Special Reference to Verminous Phlebitis.** [FAIRLEY & MACKIE.] pp. 17-39. With 63 figs. (3 coloured) on 13 plates. [24 refs.]

Skin invasion occurs freely in goats and decaudication is complete within 20 minutes. Entry may be direct through the intact skin, or by hair follicles or sebaceous glands. Since about 150,000 was the usual number of cercariae applied to the skin and 396,000 the maximum, and since complete invasion was verified, many cercariae must rapidly perish. There is considerable local skin reaction and it is believed that destruction of cercariae begins at once locally. Somewhat later there is widespread vascular infection. Thus in 30 goats killed within six months of infection the distribution of worms in veins was as follows: mesenteric 30, portal 28, gastric 12, pancreatic 11, splenic 9, pelvic 3, inferior vena cava 3, iliac, azygos and renal each 1; also right heart 4, pulmonary artery 8. Later infection becomes limited to the normal habitat—the portal and mesenteric veins—so that a biological equilibrium is established, and the destruction which has been going on to effect it apparently ceases, at least no spontaneous cure occurred in this investigation. In these heavy infections males were twice as numerous as females, yet the cercariae were invariably derived from a large number of molluscs. Lesions found before ova were produced were: extensive clotting, the clot containing dead and disintegrating flukes, with toxic spoiling of liver and kidneys, and necrosis of their cells, often over extensive areas and associated with haemorrhage; and deposit of golden brown pigment in Kupfer's cells, having origin evidently in the pigment from digested haemoglobin found in the caeca of the flukes. There is small-celled periportal infiltration and macroscopic appearance of pseudotubercles. After eggs appear the aggregation in the liver produces round them more pseudotubercles with consequent focal fibrosis, showing as a periportal cirrhosis which in its advanced stages resembles the pipestem cirrhosis described by SYMMERS (1903) in Egyptian schistosomiasis.

iv. **Further Observations on Spontaneous Cure in *Macacus sinicus*.** [FAIRLEY, MACKIE & JASUDASAN.] pp. 53-59. [8 refs.]

The monkey *Macacus sinicus* displays a degree of natural immunity to infection shown by failure of schistosomes to develop beyond a certain stage, the θ stage, after reaching which they die; yet this natural immunity becomes enhanced by previous infection. This is clear because for three months "after a primary infection, another infection is followed by almost no development in the veins. Yet it was not possible after spontaneous recovery to find any added anti-cercarial power in the serum.

- v. **The Guineapig as a Host for Male Schistosomes.** [FAIRLEY, MACKIE & JASUDASAN.] pp. 61-68. With 18 figs. on 4 plates. [13 refs.]

In guineapigs infected each with 40,000 to 72,000 cercariae only male worms were found in numbers from 11 to 720 individuals a guineapig. They produced phlebitis and thrombosis with periportal cellular infiltration and fibrosis, and degeneration of the liver cells. Clearly further clinical, serological and pathological investigations are needed to establish the pathological effects on man of male schistosomes. The cercariae entered through the hair follicles.

- vi. **The Complement Fixation Reaction with Cercarial Antigen—a Study in Experimental Serology.** [FAIRLEY & JASUDASAN.] pp. 73-143. With 18 graphs. [24 refs.]

This section comprises half the report. The protocols are exhaustive and will be studied in detail now and in the future by those engaged in this line of investigation.

A large number of experimentally infected goats were used in this enquiry, and numerous complement fixation tests were made on each animal. A special feature of the investigation was the introduction of graphs showing quantitatively the antibody content of the serum from the initial exposure to cercariae until death. Marked increase in antibody was generally demonstrated during the second week of the disease.

Adult worms have not formed reliable antigens. The cercariae are used (as in i). The method of preparation is described. Its group nature is proved for the three human schistosomes and for *S. bovis*, *S. indicum* and *S. spindale*.

The techniques are given, both warm and cold, and the persistent character of the reaction is noted, though whether this persists after destruction of all flukes by treatment there has not been time to settle. Yet the results of the slow removal of dead schistosomes may well keep up a reaction after all are dead. On the other hand the appearance of negative serological reactions during treatment does not necessarily mean disinfection. The cerebrospinal fluid has invariably been negative, and the cord and brain free from infection. After treatment with tartar emetic the male to female ratio was 6.2 to 1, and with emetine 4.3 to 1; 100 to 5, 55 to 3 and 25 to 0 and 50 to 0 being included. It is shown then that treatment tends to kill females and spare males.

C. L.

- FAUST (Ernest Carroll). **Larval Flukes associated with the Cercariae of *Clonorchis sinensis* in Bithynoid Snails in China and Adjacent Territory.**—*Parasitology*. 1930. Mar. Vol. 22. No. 2. pp. 145-155. With 5 plates. [4 refs.] [Dept. of Trop. Med., Tulane Univ. of Louisiana, New Orleans.]

Faust adds the descriptions of 10 new species of cercariae from bithynoid snails (he has already described six) and one from *Planorbis mollendorfi*. One of these, *Cercaria beatifica*, a heterophyid larva, needs to be differentiated from the cercaria of *Clonorchis sinensis* which develops in the same mollusc, *Bithynia fuchsiana*. All these forms are much commoner in bithynoid snails than is the larva of *Clonorchis*.

C. L.

DU (S. D.). **Preliminary Report on a Fluke found in Shrimps in Chengtu and its Environs.**—*China Med. Jl.* 1930. July. Vol. 44. No. 7. pp. 679-683. With 1 plate.

People of Szechwan Province "are fond of eating live shrimps previously soaked for a few minutes in Chinese wine and condiments (drunken shrimps). The poor creatures bathed in wine and condiment frequently jump out of the containing dish, and the diners often display their dexterity catching the shrimps with their chopsticks." Such shrimps collected from rivers and streams have their stomachs infected with an adult fluke (which is about 5 mm. long and is described) to the extent of 425 out of 769 dissected. It is in effect pointed out that in this strange and seemingly one-sided sport the shrimp will yet get its own back should it carry as an intermediate host a parasite capable of living in man.

C. L.

TUBANGUI (Marcos A.) & FRANCISCO (Sixto A.). **The Presence in Human Stools of the Eggs of a Trematode Parasitic in Fish.**—*Jl. Philippine Islands Med. Assoc.* 1930. Jan. Vol. 10. No. 1. pp. 31-33. With 1 text fig. [3 refs.]

Two more cases are recorded in which trematode eggs found in the faeces were shown almost certainly to have come from food. In this case they are referred to *Metadena ovata* from the intestine of the fish *Pristipoma hasta*.

C. L.

EALLES (N. B.). **A Method of obtaining Stages in the Life-History of the Liver Fluke for Class Purposes.** [Correspondence.]—*Nature.* 1930. May 24. Vol. 125. No. 3160. p. 779.

Adult flukes, alive or dead, from a slaughter house are washed free of bile and mucus and dissected under a binocular. Yellow eggs are washed out and kept in a flat-bottomed watch glass. Daily development can be watched. As soon as possible after hatching of miracidia a *Limnaeus truncatulus* is introduced and the process of infection can be watched. Snails can be killed and sectioned at intervals to show sporocyst and redia stages. Eales had no deaths of snails from infection, however heavy, during the period under report, March 11th to May 3rd.

C. L.

THOMAS (Lyonel J.). **Notes on the Hatching of *Diphyllbothrium latum* Eggs.**—*Jl. Parasitology.* 1930. June. Vol. 16. No. 4. pp. 244-245. With 1 text fig. [3 refs.]

Eggs of *D. latum* kept in 2-inch Stender glasses out of direct sunlight mostly hatched within 12 days. In a few individuals development was much slower; hatching was observed as late as the seventy-fourth day, and the hexacanth embryo was smaller and measured 18μ to 20μ instead of the normal of 24μ to 26μ . Presumably copepods are capable of becoming infected over a considerable period after deposit of the faeces, and the variable size of the procercoids within them is perhaps thus explicable.

C. L.

VOGEL (Hans). Studien ueber die Entwicklung von *Diphyllobothrium*. II. Teil: Die Entwicklung des Procercoids von *Diphyllobothrium latum*. [Development of Procercoids of *D. latum*.]—*Ztschr. f. Parasitenk.* 1930. Aug. 9. Vol. 2. No. 5. pp. 629-644. With 8 text figs. [10 refs.] [Inst. for Ship & Trop. Diseases, Hamburg.]

Examination of living larvae and those stained with methylene-green-pyronin shows that the coracidium contains separate retractor and protractor muscles for the 6 hooks, two excretory cells, and two other sets of cells, namely large plastine cells which are essentially concerned in building the body and small-body cells whose use was not determined. As intermediate hosts *Cyclops viridis*, *C. albidus*, *C. bicuspidatus* and *C. serrulatus* could not be infected, they digested the coracidium; one strain of *C. strenuus* could not be infected, others could. *Diaptomus gracilis* and *D. vulgaris*, the latter a new intermediate host, were more readily infected than *C. strenuus*. The procercoide develops under the cast-off cuticle of the coracidium. Apart from cuticle, muscle, and calcareous bodies there are formed a number of frontal glands opening by ducts at the anterior end, and a complicated excretory system with the excretory pore at the posterior end, at the base of the appendage containing the hooks, but with accessory pores anteriorly. The whole development resembles that of Holostomidae.

C. L.

VOGEL (Hans). Studien zur Entwicklung von *Diphyllobothrium*. I. Teil: Die Wimperlarve von *Diphyllobothrium latum*. [Development of *Diphyllobothrium*.]—*Ztschr. f. Parasitenk.* 1929. Oct. 12. Vol. 2. No. 2. pp. 213-222. With 6 text figs. [6 refs.] [Inst. for Ship & Trop. Diseases, Hamburg.]

In the dark the egg of *D. latum* develops normally but the embryo does not escape. If then brought into the light it becomes active and escapes past the raised operculum. In deep water those eggs hatch first which are brought to the surface, an observation which Vogel correlates with the lessened pressure there and so looks on as mechanical. Movement of the ciliated larva is directly forward with alternate rotation to left and right; the cilia at the anterior end are longer than elsewhere, all have an axial thread and a contractile covering, but beyond the latter the ends of the cilia at the anterior end project naked. Staining with azur eosin and methylene green pyronin shows that there exist cells with the shape and staining properties of the germ cells of miracidia, as well as body cells.

C. L.

O'FARRELL (W. R.). [*Diphyllobothrium latum* Infestation in Ireland.]—*Irish Jl. Med. Sci.* 1930. Sept. Ser. 6. No. 57. p. 542.

A farmer of 50, a native of Leitrim, who often ate pike, passed tapeworm segments when under treatment for diabetes. Haemoglobin 75, red corpuscles 3,390,000, eosinophils 1 per cent. Male fern brought away a ball containing 4 heads and strobila.

C. L.

GRANT (F.). 106 Bothriocephalusketten bei einem Kranken. [Patient with 106 *Diphyllobothria*.]—*Klin. Woch.* 1930. Mar. 15. Vol. 9. No. 11. p. 502. [4 refs.]

A man of 66 had been well till the autumn of the previous year. When seen in June 1929 he was slightly icteric, short of breath and too weak to

work. Haemoglobin was 25 per cent., red corpuscles 1,400,000, no eosinophilia but polymorphs having as many as 7 segments; much poikilocytosis, anisocytosis, polychromasia and many normoblasts; and many diphylobothrium eggs in the stools. "Filmiron" produced a knot of diphylobothrium strobila, weighing 400 gm. after being hardened in formalin and containing 106 heads. The blood then improved greatly and no further eggs were found in the stools.

C. L.

TALYSIN (Th.). *Dibothriocephalus minor* Chol. der kleine Bandwurm Transbaikaliens. [*D. minor*, the Transbaikalian Tape Worm].—*Ztschr. f. Parasitenk.* 1930. May 13. Vol. 2. No. 4. pp. 535–550. With 17 text figs. (2 coloured). [5 refs.] [Biol. Lab., State Univ., Irkutsk.]

Ten examples were recovered from 2 men, with these characters. The length lies between 10 and 26.5 cm. with about 200 proglottids. The head in dorso-ventral view is conical with rounded point, and with the suckers running on to the body so that there is no neck. In the last proglottids the length is $\frac{2}{9}$ of the breadth. The edges of the strobilus have a serrated effect. The ovaries are compressed antero-posteriorly (cephalo-caudally) so that the long axis lie across the proglottis. The vagina passes forward in curves. The uterine coils lie mainly from side to side and some lie in front of the uterine opening which is situated about the middle of the proglottis. The vas deferens coils posteriorly to the ootype before coursing anteriorly. The eggs often have a terminal tubercle and the relation of length to breadth is a 3 to 2. The figures make the structure abundantly clear.

C. L.

NAGOYA (Takeguma). Route of Migration of the orally fed *Ligula mansoni* Cobbold in Frog and Mouse.—*Japan. Jl. Experim. Med.* 1930. Feb. 20. Vol. 8. No. 1. pp. 39–54. [14 refs.]

Considerable numbers of plerocercoids were fed to frogs and mice. The degree of migration from the alimentary canal depended on the temperature of the host. In the mouse, the peritoneal cavity might be reached in an hour; in the frog in September in 2 hours, while in February no attempt was made to leave the alimentary canal within 11 hours. From the peritoneal cavity the worms in the frog reached connective tissue behind the thyroid, and heart, and penetrated the muscles and even attempted the passage of the nutrient foramen of the femur. They produced much tearing and haemorrhage and eventually settled mostly in the muscles at the back of the thigh. In the mouse dispersion and damage were as great, but it is noteworthy that those which entered lymph glands are the only ones referred to as necrotic, while those entering the liver were enclosed in connective tissue. In the mouse the subcutaneous tissue is the popular final habitat.

C. L.

STORTI (Edoardo). Anemia sperimentale da botriocefalo. (Nota preventiva.) [*Experimental Diphylobothrium Anaemia*].—Reprinted from *Bol. Soc. Med.-Chirurg. di Pavia*. 1930. Vol. 8. No. 3. 8 pp. [Inst. of Comp. Anat. & Physiol., Univ., Pavia.]

The author infected three dogs with spargana of *D. ranarum*. In ten days the worms matured and ova were found in the faeces, but

for a month no recognizable symptoms were produced. After this one dog went rapidly downhill, became very anaemic and emaciated and died in three months. The red cells were reduced to about a million, and 27 per cent. of them were nucleated. The anaemia was of a lytic type with considerable attempts at regeneration on the part of the bone marrow. In the second dog the course was much longer and the anaemia developed much more gradually though the final picture, after 7 months, was closely similar. The third showed only a slight fall in the red cells and remained in that state for the 8 months of observation. The bone marrow in the first showed marked hyperplasia; spleen sections presented a myeloid metaplasia with erythroblasts, myelocytes and megakaryocytes scattered irregularly in the sinuses and spleen pulp.

H. H. S.

KOBAYASHI (Hidekazu). *Studies on the Development of Diphyllobothrium mansoni* Cobbold, 1882 (Joyeux 1928). (I. Report.) *Embryonal Development in the Egg of Diphyllobothrium mansoni*.—*Taiwan Igakku Zasshi* (Jl. Med. Assoc. Formosa). 1930. Sept. No. 306. [In Japanese. With 23 figs. on 1 plate. English summary pp. 44-49.] [Govt. Med. College of Formosa, Taihoku, Japan.]

The egg of *D. mansoni* develops easily in water to an onchosphere in 12 to 14 days at 28° C. The growth from day to day was studied, is described, and is well pictured.

C. L.

LUTZ (Hermann). Ein Fall von *Dibothriocephalus mansoni* s. *Sparganum mansoni*. [Case of Ocular Sparganosis].—*Arch. f. Schiffs- u. Trop.-Hyg.* 1930. July. Vol. 34. No. 7. pp. 398-399. [1 ref.] [Tet-Tsi Hosp., Kaying, Canton, China.]

Another case in which ocular sparganosis followed the application to the eye of frog's muscle, in this case minced [this *Bulletin*, Vol. 27, p. 964].

C. L.

JOYEUX (Ch.) & FOLEY (H.). *Recherches épidémiologiques sur l'Hymenolepis nana et sur l'Hymenolepis fraterna*. [Epidemiological Researches on *H. nana* and *H. fraterna*.]—*Arch. Inst. Pasteur d'Algérie*. 1929. Mar. Vol. 7. No. 1. pp. 31-50. With 1 map & 4 figs. on 2 plates. [18 refs.] [Pasteur Inst. of Algeria, Algiers.]

The line of thought runs thus. There are two names to the dwarf tapeworm given to two sets of specimens which cannot be distinguished by any morphological test, *H. fraterna* and *H. nana*. These authors hold that they nevertheless constitute two biological species, the former found in rats, mice, field mice and dormice and capable of experimental transmission to allied rodents, and the latter found in man only but experimentally capable of transmission to the rat. No tapeworm which they identify as *H. nana* or *H. fraterna* has been found in rats, mice, or any other rodent in the Algerian Sahara. *H. ruicostoma* has been found once in 213 mice, recognizable it is held by its genital ducts and the number of its eggs. The mouse is the only rodent found in houses and it, as noted, is free from infection. Accordingly infection with *H. nana* is carried directly from man to man.

C. L.

ROMEO (Nunzio). Un caso di associazione di *Hymenolepis nana* e *diminuta*. [A Case of Infection by *Hymenolepis nana* and *H. diminuta*.]—*Arch. Ital. Sci. Med. Colon.* 1930. Nov. 1. Vol. 11. No. 11. pp. 680-684. With 1 text fig. English summary (3 lines). [Lab. of Colonial Path., Bologna.]

A man of 26 years presented himself at the Laboratory of Colonial Pathology [nothing is said as regards symptoms or reasons for his coming for examination; in fact he was "in the best of health"]. The blood showed 6 per cent. eosinophiles and in the faeces were ova of *H. nana* and *H. diminuta*. This was the third such case seen at the laboratory. He had travelled considerably in Italy, but the source of infection could not be determined.

H. H. S.

CLARK (Esther B.). Human Infestation with the Rat Tapeworm (*Hymenolepis diminuta*).—*Jl. Amer. Med. Assoc.* 1930. Nov. 1. Vol. 95. No. 18. p. 1342.

A boy of 4 who ate dirt, sand, leaves, sticks and toys whenever he could and who experienced abdominal pain and loss of [healthy] appetite, finally made a meal of a rubber sponge. The cathartic which deservedly followed revealed tapeworm infection, and male fern expelled 14 tapeworms in a mass. Since then "his appetite is vastly better."

C. L.

INGALL (Morris) & FREEMAN (Harry). The Prevalence of Tapeworm Infestation in Jewish Patients.—*New England Jl. of Med.* 1930. Apr. 3. Vol. 202. No. 14. pp. 679-681. [6 refs.]

The patients number 9, 8 women of whom 6 harboured *D. latum* and 2 *T. saginata*, and 1 man with *D. latum*. Two of the broad tapeworm patients were born in and had never left the United States, 3 came from Russia and 1 from Poland; the red corpuscles varied from 3,880,000 to 5,450,000; in only 2 cases was there an appreciable rise of eosinophils, namely to 5 and 18 per cent.

C. L.

DENHAM (A. A.). *Taenia saginata* Infection. [Memoranda]—*Brit. Med. Jl.* 1930. July 19. p. 101.

The real interest of the case lies in the toxic symptoms following treatment. A dose of one and a half drachms [6 cc.] of extract of male fern on an empty stomach produced within 10 minutes of taking it collapse, coma and twitching in a Jewess of 56. A stuporous state continued for 2 hours. The bowels then moved and consciousness was recovered. A *T. saginata*, identified by LEIPER, was later passed.

C. L.

EGUCHI (Suyeo) & NISHIYAMA (Iori). Studien über *Taenia solium*. [Studies on *T. solium*.]—*Trans. Japan. Path. Soc.* 1930. Vol. 20. pp. 577-579. [Med. High School, Osaka.]

In slaughtered swine, the annual numbers between 1916 and 1929 lying between 16,000 and 24,000, the percentage infected with *Cysticercus cellulosae* was highest in 1926, namely 2.71 per cent., and in 1929 was 0.94 per cent. Muscle, heart, brain, orbit and tongue were infected in that order, but in 42 infected carcasses the muscles were free in 9 only. Hooks on the scolex might be as low as 9 and on the

onchosphere as many as 8. In man 25 cases of infection by the strobilus are recorded [the number examined being unstated].

C. L.

CAMERON (T. W. M.). **A New Record of the Occurrence of a Tapeworm of the Genus *Bertiella* in Man.**—*Jl. Helminthology*. 1929. Dec. Vol. 7. No. 4. pp. 231–234. [3 refs.]

A tapeworm was recovered by Dr. S. B. JONES from a young negress who had never left St. Kitts, B.W.I. Cameron found it to be a *Bertiella*, and recovered young specimens of *Bertiella* from one of the West African green monkeys with which the island is overrun. The question of identity of *B. studeri* of the Old World and *B. mucronata* of the New is considered.

C. L.

MAPLESTONE (P. A.). **A New Case of *Bertiella studeri* in a Human Being.**—*Indian Med. Gaz.* 1930. May. Vol. 65. No. 5. pp. 258–260. With 2 text figs. [5 refs.] [School of Trop. Med. & Hyg., Calcutta.]

After filix mas 28.9 cm. of strobilus was found but no head. The structure was that of *B. studeri* but the mature segments measured 14.5 mm. long by 3 mm. broad. Maplestone points out that the superficial area is 4.35 sq. mm. as compared with the 4.5 sq. mm. of FAUST's specimen with its measurements of [0.75] by 6 mm.; and suggests that the area of a segment is likely to prove a better diagnostic guide for the motile cestode than the length and breadth.

C. L.

CUFF (Cyril H.). **Forty Cases of Hydatid Disease.**—*Brit. Med. Jl.* 1930. Oct. 11. pp. 599–600.

Of these 40 operations reported from Cyprus, in 31 the cyst was in the liver, 3 in the lung, 3 in the omentum, and 1 each in thigh, ischio-rectal fossa and uterus. The last had metrorrhagia, daughter cysts loose in the vagina, and more expelled through the patulous os on pressure. X-rays, complement fixation and Casoni reaction were all used in diagnosis. Eosinophilia was present in half the cases.

C. L.

LOUCKS (H. H.). **Hydatid Cyst. A Review and a Report of Cases from North China.**—*Nat. Med. Jl. China*. 1930. Aug. Vol. 16. No. 4. pp. 402–496. With 31 figs. on 18 plates. [156 refs.] [Peiping Union Med. College, Peking.]

The subject is considered at length and 16 cases described. In 11 the diagnosis was confirmed at operation. In them the liver was infected in 10, with simultaneous infection of the peritoneum in 2, of the spleen in 1, and of the spleen and femur in 1; the orbit was infected in 1. Of 5 cases clinically diagnosed the liver was infected alone in 3, the liver and spleen in 1, and the lung in 1.

C. L.

WILLIS (Rupert A.). **Some Diagnostic Difficulties in Hydatid Disease.**—*Med. Jl. Australia*. 1930. June 21. 17th Year. Vol. 1. No. 25. pp. 810–813. With 4 figs. on 1 plate.

Seven cases are described in detail in which hydatid infection went undetected, at least for a time. The moral is that this condition should

be considered in obscure pulmonary states in which tubercle bacilli are not detected, particularly if the puzzling condition is at the bases ; when there are abdominal masses particularly in the liver with no apparent primary growth ; and when there are bone lesions recalling tubercle or other inflammatory disease.

C. L.

MOLLOW (W.). Die Bedeutung der Reaktion nach Casoni für die Diagnose der Echinococcenkrankheit des Menschen und ihre Einwirkung auf die anderen biologischen Reaktionen. [**Significance of Casoni Reaction for Diagnosis of Echinococcal Disease in Man and its Influence on Other Reactions.**]—*C. R. Congrès Internat. de Méd. Trop. et d'Hyg. Le Caire, Egypte, Décembre, 1928.* Vol. 2. pp. 649-659.

The author concludes that of biological reactions for the detection of hydatid infection the Casoni reaction, by reason of its certainty and ease, is the best. It can produce far-reaching cellular and humoral changes, such as eosinophilia in predisposed persons and a Weinberg's reaction. The Casoni reaction is most sensitive, but whether it is specific or non-specific only further tests can show.

C. L.

V. HECKER (Hans) & KELLNER (Frank). Zur Diagnostik der Lungenzystizerkose beim Lebenden. [**Diagnosis of Pulmonary Cysticercosis during Life.**]—*Fortschr. Geb. Röntgenstrahlen.* 1929. Vol. 39. No. 4. pp. 624-628. With 4 figs. [6 refs.]

A suspected pulmonary tuberculosis showed to the X-rays a number of defined round shadows in the lungs. This is stated to be the third case of pulmonary cysticercosis diagnosed during life.

C. L.

BANERJI (Kumaresch Chandra). **Tape-Worm Infection causing Abdominal Tumours.**—*Calcutta Med. Jl.* 1930. Sept. Vol. 25. No. 3. pp. 130-131.

A single doughy mass disappeared simultaneously with passage of many segments of *T. saginata*. The man said he had not taken beef for at least 8 years, but was in the habit of taking pork.

C. L.

MILLER (Harry M.) Jr. **Experiments on Immunity of the White Rat to *Cysticercus fasciolaris*.**—*Proc. Soc. Experim. Biol. & Med.* 1930. June. Vol. 27. No. 9. p. 926. [Zool. Dept., Washington Univ., St. Louis, Mo.]

By small intraperitoneal injections of dried pulverized worm material at 2 to 3 days intervals it was found that, in animals fed with onchospheres 5 weeks later and examined a month afterwards, the young worms were for the most part dead, and measured on the average 1 mm. in diameter ; whereas in controls fed with the same quantities of the same suspension of onchospheres they averaged 2 to 5 mm. in diameter. There is some evidence too that the presence of one or more relatively huge cysts confers immunity to a superinfection.

C. L.

HASEGAWA (K.). Ueber einen *Trichostrongylus* (*T. instabilis*, Railliet, 1893) aus dem Kaninchen. [**A *Trichostrongylus* from the Rabbit and its Development.**]—*Taiwan Igakkai Zasshi* (Jl. Med. Assoc. Formosa). 1929. Aug. No. 293. [In Japanese. German summary pp. 37-39.]

—. Ueber die Entwicklungsgeschichte des *Trichostrongylus instabilis* und experimentelle Infektionen.—*Ibid.* [In Japanese. German summary pp. 39-40.] [Med. High School, Taihoku.]

i. Although found in rabbits Hasegawa's conclusion is that this worm actually is *T. colubriformis* [of which *T. instabilis* is a synonym] and not *T. retortaeformis*, and his description and, so far as they can be deciphered, his photomicrographs strongly support his conclusion, a matter, it may be added, of medical importance seeing how relatively frequently more exact diagnostic method shows that this nematode parasitizes man.

ii. At 18° C. to 20° C. larvae show their first ecdysis in two days, and become infective in 5 to 7 days, by which time they measure 0.729 mm. long and 0.0024 mm. broad. Infective larvae are unusually resistant to chemicals, heat and drying. After oral infection no passage through the lungs could be detected by direct examination or by tracheotomy, in rabbits, mice or dogs. Infection through the skin either failed or was effected by few larvae only even when there was a breach in the epidermis.

C. L.

LEE (C. U.). **Some Observations on *Strongyloides stercoralis*.**—*Arch. f. Schiffs- u. Trop.-Hyg.* 1930. May. Vol. 34. No. 5. pp. 262-274. With 9 text figs. [10 refs.] [Inst. for Ship & Trop. Diseases, Hamburg.]

Lee has attempted to confirm NISHIGORI's work [this *Bulletin*, Vol. 25. p. 962] and writes: "It is unfortunate that Nishigori's paper is in the Japanese language, making it difficult to examine critically his experimental techniques, which gave results so entirely different from those of previous authors." Lee's own technique consists of an extraction by Baermann's apparatus of rhabditiform larvae from fresh infected faeces mixed with coarse sterile sand; after 1 hour in the incubator at 37° C. they formed a seething white mass at the bottom of the receiving tube. From cultures direct filariform, and indirect rhabditiform and filariform larvae were collected. Lee's own check of NISHIGORI's reported results was negative, but he found that indirect were larger than direct filariform larvae, and that there was a difference in the size of the genital primordium of the 4 forms but no difference in the number of the constituent cells, that of the direct rhabditiform larva being the largest and of the indirect filariform larva the smallest.

C. L.

LEVIN (A. L.). **The Problem of Eradication of *Strongyloides intestinalis*.**—*Amer. Jl. Trop. Med.* 1930. Sept. Vol. 10. No. 5. pp. 353-363. [13 refs.] [Graduate School of Med., Tulane Univ., New Orleans.]

An experience of 28 cases in Louisiana and Mississippi led to the conclusions that no age is exempt, white males are more commonly

infected than other persons, there is a mild anaemia and eosinophilia with gastro-intestinal disturbance and biliary toxæmia, passing to diarrhoea and colic in severe cases. Gastric acidity ranges from "achylia" to mild hyperchlorhydia, and ordinarily the general health is undisturbed. The length of the infection and uselessness of present treatments are mentioned and expectation expressed as to the probable value of the intravenous route for medication.

C. L.

DE LANGEN (C. D.). Postscript about Anguillulosis and Eosinophilia. [**Strongyloidosis and Eosinophilia.**]—*Meded. Dienst d. Volksgezondheid in Nederl.-Indië*. 1929. Vol. 18. No. 2. pp. 310-314. [51 refs.]

It is noted as a sequel to a former paper [this *Bulletin*, Vol. 26, p. 543] that the presence of eosinophilia led to the finding that cases which had been held cured by tartar emetic and gentian violet relapsed, so that after this treatment repeated courses are required. Anal itching, reported by FÜLLEBORN as occurring in strongyloides cases, was noted by de Langen once only—in a European. The absence in natives is attributed to their custom of washing the anus after defaecation. The list of references was inadvertently not published with the previous paper.

C. L.

BRÜCKNER. **Anguillula intestinalis.**—*Med. Klin.* 1930. Nov. 14. Vol. 26. No. 46 (1353). pp. 1703-1704.

Strongyloides [unfortunately described as 2 to 6 cm. long] is present in the Ruhr. Six cases with weakness, giddiness, pain in head, abdomen and liver, loss of weight, eosinophilia of 6 to 30 and larvae in the stools are described, as well as others with less disturbance. All of many drugs have proved useless to expel the worm.

C. L.

DATTA (Subodh). **Infection by a Gnathostome simulating Mastoiditis.**—*Indian Med. Gaz.* 1930. June. Vol. 65. No. 6. pp. 314-315. [Carmichael Med. College, Calcutta.]

MAPLESTONE (P. A.). **A Note on the Parasite.**—*Ibid.* p. 315. [School of Trop. Med. & Hyg., Calcutta.]

A sore throat was followed by a severe earache with discharge of blood from the ear but an intact tympanic membrane; a swelling involving the right mastoid, temporal and pre-auricular regions, and both right lids; red corpuscles 2,100,000, white corpuscles 6,250, eosinophils 5 per cent. On making the usual mastoid incision a wormlike body was seen on the deep surface of the temporal muscle and the operation stopped since the bone appeared sound. Maplestone identified it as a typical full-grown male *Gnathostoma spinigerum* 15.1 mm. long. It is noted that this is the second case reported in man from India, the first by Maplestone in November, 1929, and that of the 12 human cases the sex of the worm has been noted in 4, and all were males.

C. L.

- i. DOERR (R.) & SCHMIDT (G. W.). Studien über den Mechanismus der Trichinelleninfektion. VII. Mitteilung: Experimentelle Beeinflussung der Trichinenwanderung.—Die natürliche Immunität des Huhnes. [**Mechanism of Trichinella Infestation.**]—*Zent. f. Bakt. I. Abt. Orig.* 1929. Feb. 20. Vol. 115. No. 7/8. pp. 427–437. With 7 coloured figs. on 2 plates. [Hyg. Inst., Univ., Basle.]
- ii. FELDMANN (I.). Bemerkungen zu der VII. Mitteilung von R. Doerr und G. W. Schmidt: "Studien ueber den Mechanismus der Trichinelleninfektion."—*Zent. f. Bakt. I. Abt. Orig.* 1930. July 28. Vol. 117. No. 7/8. pp. 498–499.

i. It is found that infiltration of a masseter with tartar emetic solution prevents invasion by trichinella larvae. In guineapigs, larvae have entered striped muscle fibres within 8 hours of the intestinal trichinella being injected into the muscle, and after a week they have grown but not rolled up. In fowls and pigeons feeding on measly meat produces no invasion of muscle, but adult forms are found in the gut 10 or 12 days after feeding; if, however, adult females are injected into the muscle, larvae enter the fibres as they do in guineapigs.

ii. Feldmann points back 39 years to the work of v. GENERSICH, published in the *Hungarian Medical Weekly (Orvosi Hetilap)* of 1891, who found that muscular infection with trichinella did not take place in ducks, pigeons and fowls, but that in ducks the intestinal forms could be found for less than 6 days whereas in pigeons they persisted 7, 9, 10 or even 22 days. He also investigated the intestinal reaction.

C. L.

GATOWSKAJA (R. G.) & KASAKOFF (P. T.). *Trichocephalus dispar* und seine radikale Behandlung mit Osarsol. [**T. dispar and its Radical Treatment with Osarsol.**]—*Wien. Klin. Woch.* 1930. July 17. Vol. 43. No. 29. pp. 906–908. [17 refs.]

The authors cured 28 of 36 trichuris infections by osarsol, which is a stovarsol synthesised in Russia. The dose was 0.5 gm. in tablet form three times daily for 3 consecutive days preceded by two days of liquid diet and followed by a purge. Telemann's method of faecal examination was used and was repeated several times before cure was accepted.

C. L.

SKRJABIN (K. I.), PODJAPOLSKAYA (W. P.) & SCHICHOBALOWA (N. P.). Neue Fälle der Hepaticolosis beim Menschen. [**Hepaticola Infestation in Man.**]—*Russian J. Trop. Med.* 1929. Vol. 7. No. 7. pp. 449–450. With 1 text fig. [3 refs.] [In Russian. German summary p. 450.]

The three cases, in Amur, were recognized by finding in the faeces eggs measuring $58\ \mu$ by $30\ \mu$. The exact criteria by which the eggs of *Hepaticola hepatica* were distinguished from those of *Trichuris trichiura* are not given, but it is stated that although resembling the latter they differed from them so sharply that there could be no doubt that they belonged to one of the species of *Hepaticola*. Nothing is mentioned regarding source of infection, nor apparently were rats examined.

[The finding of hepaticola eggs in the faeces is unexpected. If these rather large eggs were those of this parasite, perhaps they had been taken swallowed in food.]

C. L.

TROISIER (J.) & DESCHIENS (R.). L'hépatocoliase. [**Hepaticoliasis.**]
—Reprinted from *Ann. de Méd.* 1930. Apr. Vol. 27. No. 4.
pp. 414-425. With 2 text figs. [24 refs.]

Because hepaticola eggs average 51.5μ in length in the chimpanzee as against 55μ in the rat, the writers designate a new species *H. anthropopitheci* and suggest that it is uncertain which form parasitizes man. The eggs are laid within the parenchyma of the hepatic lobule and are not excreted through bile and faeces. Some are destroyed in the liver, giant cells entering by the terminal pores and devouring the contents; others are shut in by cellular infiltration ending in cirrhosis, the effect on the host depending on the extent of oviposition. Though the adult worms speedily die and are absorbed, eggs may live for two years so that they may presumably be passed on by cannibalism or by being swallowed inadvertently after decomposition of the host.

C. L.

VOGEL (Hans). Ueber die organotropie von *Hepaticola hepatica*. [**The Organotropy of *H. hepatica*.**]—*Ztschr. f. Parasitenk.* 1930. May 13. Vol. 2. No. 4. pp. 502-505. [3 refs.] [Inst. for Ship & Trop. Diseases, Hamburg.]

Rats were fed on eggs of *H. hepatica*. Six to twelve days later their livers contained larvae of the worm, and these livers were fed to nine rats. In none of these nine rats was any infection established, so that so far as this stage of development goes cannibalism seems to have no hand in passing on infection. When infective larvae were extracted from such livers and injected into the wall of stomach, prestomach, spleen, lung or subcutaneous tissue, no development occurred in these sites, though it might occur in the liver. It is concluded that larvae reach the organ by the blood stream and, finding conditions suitable, settle there.

C. L.

MOMMA (Kenji). Notes on Modes of Rat Infestation with *Hepaticola hepatica*.—*Ann. Trop. Med. & Parasit.* 1930. Apr. 7. Vol. 24. No. 1. pp. 109-113. With 1 graph in text. [12 refs.] [Med. College, Osaka, Japan.]

H. hepatica was found in the livers of 57.2 per cent. of 2,222 "house rats," but the eggs could not be detected in the contents of the intestinal canals of twenty-nine of them which were examined. The degree of infection was seasonal, highest in spring, least in summer. The eggs were found in the recta of 5 of 503 cats employed in destroying rats in a hide factory. Flies, fed on rats' livers, carried eggs on their bodies to the extent of 32.9 per cent. and in their guts to 63.9 per cent. and the eggs remained viable after passing through the alimentary canal of cat or fly or being dried. The fly is accordingly believed to be chief agent in transmission [a conclusion at variance with the suggestion that propagation depends on cannibalism].

C. L.

MACARTHUR (W. P.). Threadworms and Pruritus Ani.—*Jl. Roy. Army Med. Corps.* 1930. Sept. Vol. 55. No. 3. pp. 214-216.

MacArthur insists that in nocturnal pruritus ani the first cause to exclude is enterobius, which, as he graphically describes, can be caught at its irritating misdeeds, if at the time a quick examination with a

flashlight is made. The movements of these females actually cause "an intolerable, light, rapid tickling." The treatment strongly advised is a two ounce injection of kitchen salt—two tablespoonfuls to a pint—which is only really effective when pruritus is felt. It is repeated nightly or as often as pruritus is felt and if this continues longer than 6 weeks self-infection is probable. In this connexion MacArthur mentions finding fragments of a worm and several dozen eggs under a single fingernail. The injection ensures a peaceful night. The hands must be scrubbed immediately on waking and whenever the underclothing or skin has been touched.

C. L.

VONDERMÜHLL (R.). Erfahrungen mit Antivermol in der Kinderpraxis. [**Antivermol in Pediatrics.**]—*Schweiz. Med. Woch.* 1930. Mar. 29. No. 13. pp. 299-300. [Children's Hosp., Basel.]

Antivermol was given in pill form 3 times a day before food to children whose mothers had seen threadworms in the stools. There are two sizes of pill suited to different ages. The subjective symptoms disappeared in 3 or 4 days but the first course of treatment was continued for 10. After an interval it was repeated, more than once if necessary. No ill effects were noted in 110 cases and of them 29 were held cured after 10 days, 27 after 3 weeks and 32 after a month. The other 22 ceased attendance.

C. L.

DURAND (Gaston). Traitement de l'oxyurase. [**Treatment of Oxyuriasis.**]—*Marseille-Méd.* 1929. Dec. 5. Vol. 66. No. 34. pp. 712-713. [3 refs.]

For 3 days, purgation and a mixture of equal parts of syrup of nerprun* and tincture of jalap. The dose for an adult is 2 dessertspoonfuls on the first day and 2 tablespoonfuls on the second and third. There follows a rest of 5 days and then a laxative treatment. For children the dose is 2 teaspoonfuls daily for 3 days. The treatment should not be used in those with colitis.

C. L.

GOODALE (Raymond H.) & KRISCHNER (Harald). *Oxyuris vermicularis* in the Peritoneum.—*Arch. Pathology.* 1930. Mar. Vol. 9. No. 3. pp. 631-634. With 1 text fig. [19 refs.] [Path. Dept., American Univ., Beirut.]

A seventh is added to the known, and harmless, cases of *E. vermicularis* found encysted in the peritoneum, all women, the worm having presumably reached this site through the genital tract. The cases in which the worm has been found in an abscess of the intestinal wall are discussed.

C. L.

BACIGALUPO (J.). Oeufs de *Oxyuris incognita* ou *Heterodera radiculicola*. [**Eggs of *H. radiculicola*.**]—*C.R. Soc. Biol.* 1930. Oct. 16. Vol. 105. No. 27. pp. 118-119. With 1 text fig. [5 refs.]

H. radiculicola eggs are reported from human faeces in Buenos Aires. Other reports from Australia, California and New Orleans are mentioned, but London is omitted.

C. L.

* A corruption of *notre prune*, prepared from the berries of *Rhamnus cathartica*.

KING (H. H.), PANDIT (C. G.), MENON (K. P.) & IYER (P. V. Seetharama). **A House-to-House Filariasis Survey in Saidapet, 1927-1928, and a Note on the Source of Filarial Infection in Mosquitoes.**—*Indian Jl. Med. Res.* 1929. Oct. Vol. 17. No. 2. pp. 406-420. With 1 map & 4 figs. in text & 1 plate. [6 refs.] [King Inst. of Preventive Med., Guindy, Madras.]

Of 1,633 persons examined 4.27 per cent. had elephantiasis and 2.33 had other clinical evidences of filariasis (fever and lymphangitis, enlarged glands and enlarged testis or hydrocele) and 16.3 per cent. microfilariae in the blood. While clinical filariasis and elephantiasis were commonest at ages over 40, microfilariae were commonest between 21 and 30, while of 57 elephantiasis cases only 1 had microfilariae, and he was a slight and early case; this is attributed to the development of a reaction in the body against filariae and microfilariae.

Regarding captured mosquitoes, filarial development was found to occur only in *Culex fatigans* and 34.6 per cent. of 1,741 of them were found infected with microfilariae. These were *Mf. bancrofti* for the following reasons: Their structure corresponded; only mammalian blood was found by the microscope, and by serological tests only that of man and bovines; *C. fatigans* could not be infected from dogs containing *Mf. immitis* or *Mf. recondita*, only light infections being, however, recognized in the dogs, nor from calves containing microfilariae. Accordingly it is concluded that the microfilariae found in *C. fatigans* were those of *F. bancrofti* obtained from man. It is suggested that filariasis is associated with occupational damage to lymphatics, the microfilaria rate being: in dhobies who stand washing clothes in water 9.1, in weavers who sit for hours moving their looms with their legs 23.5, in shopkeepers who sit for hours cross-legged 26.5, in skilled labourers 3.1 and in clerks 10.0.

C. L.

KORKE (Vishnu T.). **Observations on the Correlation between the Incidence of Filarial Infection in the Human Host and in the Insect Carrier in Relation to Terrain. Part V.**—*Indian Jl. Med. Res.* 1930. July. Vol. 18. No. 1. pp. 319-331. With 1 map. [8 refs.] [Central Research Inst., Kasauli.]

— **Observations on the Characters of Filarial Endemic Areas in Bihar and Orissa. Part VI.**—*Ibid.* pp. 333-336. [7 refs.] [Central Research Inst., Kasauli.]

F. bancrofti infection lessens in intensity in Bihar and Orissa from the sea coast through the Gangetic plain to the submontane arable areas. Of mosquitoes Korke has implicated *C. fatigans* alone as intermediate host, its infection being highest in June and July. Areas of paddy cultivation appear to be endemic centres.

C. L.

KORKE (Vishnu T.). **Observations on the Natural History of *F. bancrofti* in Dwellings in Relation to the Systems of Drainage. Part VII.**—*Indian Jl. Med. Res.* 1930. Oct. Vol. 18. No. 2. pp. 427-442. [2 refs.] [Central Research Inst., Kasauli.]

The drainage headings considered are cement drains, non-cement drains, cesspool, and no system. *Culex fatigans* is the mosquito

concerned and is domestic. Any system of drainage may lead to accumulation of water with breeding, but a neglected cement drain is the most frequent accompaniment of filarial infection. The first step in prophylaxis is to keep the cement drain and cesspool systems in strict sanitary order.

C. L.

RAO (S. Sunder) & IYENGAR (M. O. T.). **Studies on the Influence of Season on the Development of *Filaria bancrofti* in *Culex fatigans*.**—*Indian Jl. Med. Res.* 1930. Jan. Vol. 17. No. 3. pp. 759-767. With 1 text fig. & 5 figs. on 2 plates. [4 refs.]

This laboratory work was carried out in Calcutta. The technique is described. The percentage and intensity of infection and the time taken for larvae to complete their development in *Culex fatigans* varied with the season. High temperature and humidity whether naturally or artificially produced give the highest infections. Microphotographs show how heavy the infection could be.

C. L.

RAO (S. Sundar). **Records of Findings of Adult *Wuchereria (Filaria) bancrofti* in India.**—*Indian Med. Gaz.* 1930. Sept. Vol. 65. No. 9. pp. 481-483. With 4 text figs. [6 refs.]

Rao states that the finding in India of adult *F. bancrofti* has been recorded in four papers only—LEWIS 1877, SIBTHORPE 1889, MAITLAND 1894, CRUICKSHANK and WRIGHT 1913-14. He records six cases with microphotographs.

C. L.

ACTON (H. W.) & RAO (S. Sundar). **Factors which determine the Differences in the Types of Lesions produced by *Filaria bancrofti* in India.**—*Indian Med. Gaz.* 1930. Nov. Vol. 65. No. 11. pp. 620-630. With 3 maps, 1 text fig. & 5 plates. [9 refs.]

Six areas in India have been investigated. Stress is laid on the "effective period of infection." *Filaria* larvae require certain conditions of temperature and moisture for their optimum development in *culex*. If the climate is such that these fully coincide with the breeding season of *culex*, filariasis is great. In proportion as there is not full coincidence filariasis lessens. The first constitute hyper-endemic areas and in them the immature filariae, if injected by *culex* in numbers, produce irritation of the first gland encountered, usually the groin gland, in the form of periadenitis and conversion of the gland into granulation tissue, followed by fibrotic shrinking, often with adult filariae in the hilum of the gland. The result is elephantiasis. In moderate endemic areas it is held that the immature filariae block, not the first gland encountered but, in the case of the lower limbs, the juxta-aortic. The result is hydrocele primarily, and gland changes are less intense. The age at which lesions begin to occur is earlier the greater the endemicity. Further variations in the intensity of the lesions produced by *F. bancrofti* are dependent on two factors, the degree of helminthic and of coccal infections.

C. L.

ACTON (H. W.) & RAO (S. Sundar). **The Causation of Lymph-Scrotum.**—*Indian Med. Gaz.* 1930. Oct. Vol. 65. No. 10. pp. 541–546. With 4 text figs. & 1 coloured plate. [7 refs.]

Elephantiasis of the scrotum and lymph scrotum are each described and illustrated, though the legends to the reproduced photographs of these conditions have evidently been transposed. Nine cases of lymph scrotum are described, and in every one there had been an antecedent operation for hydrocele. The view taken, after a study of the anatomy of the lymphatic system of the abdomen, is that a hydrocele or chylocele is really an overflow reservoir for lymph dammed back by fibrosed lymph nodes, and that when the sac is removed its function is taken up by a dilatation of the lymph vessels as a lymph scrotum, which is accordingly man made. In seven cases in which both lymph from the oozing scrotum and the peripheral blood were examined, microfilariæ were present in all cases in the lymph and only once in the blood.

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C. L.

BANERJEE (Kali Gati). **Filarial Periodicity.**—*Indian Med. Gaz.* 1930. Mar. Vol. 65. No. 3. pp. 144–149. With 2 text figs.

The term periodicity is used in this paper in two senses; the first is that of attacks of filarial illness in which, in the author's view, the moon is of essential importance, the symptoms coming at the new moon, or at the full moon or at the quarter, or on the 11th day [or indeed, taking the other suggested causes into consideration, probably on any day of the moon].*

The second sense in which periodicity is used is the ordinary one, the hour of the day at which embryos are found in the peripheral blood. [While adding certain errors of transcription or sense this paper follows precisely the detailed order of and even uses the same words as that of the reviewer (this *Bulletin*, Vol. 26, p. 981) on "The mechanism of filarial periodicity," which however it does not mention. One gets more and more used to these extraordinary coincidences.]

C. L.

ACTON (H. W.) & RAO (S. Sundar). **Urticaria due to Filarial Toxin.**—*Indian Med. Gaz.* 1930. Mar. Vol. 65. No. 3. pp. 130–132. [5 refs.]

In their work between 1926 and 1929 Acton and Rao "have observed several characteristic cases of urticaria which could be definitely ascribed to infection by *Filaria bancrofti* . . . evidently the first records of such a manifestation of filarial infection." The cases number seven, five had microfilariæ in the blood, all showed moderate eosinophilia, there was no sensitiveness to particular food proteins

* "The weather depends on the moon as a rule, and I've found that the saying is true,
"For at Bala it rains when the moon's at the full, and it rains when the moon's at the new.
"When the moon's at the quarter then down comes the rain; at the half its no better, I ween;
"When the moon's at three-quarters it's at it again—and it rains besides mostly between."

except in one who showed marked reaction to almost every test. The periodicity of the rash was sometimes a daily one, sometimes irregular. Its appearance is attributed to liberation of toxins during embryoposition and it is held that study of its incidence should give definite knowledge whether embryos are posited continuously or periodically.

C. L.

CERQUA (Saverio). Akute eitrige Epididymitis und Deferentitis bei Filariasis. [**Acute Suppurative Epididymitis with Filariasis.**]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1930. July. Vol. 34. No. 7. pp. 354-357. With 3 text figs. [Umberto I Italian Hosp., Cairo.]

Stating that the Calcutta school holds that filariae do not themselves produce changes in the body but merely act as foreign bodies, and that when acute complications arise it is as the result of an added staphylococcus infection, Cerqua ranges himself on their side. Operation disclosed that an inflammatory condition of two months standing was caused by a little-altered testis, a thickened tunica vaginalis, an epididymis in which the seminal canals were as much as 0.5 cm. in diameter and full of creamy pus and the connective tissue full of inflammatory cells, and a thickly infiltrated cord. A female filaria was found in the testis itself and comment is made on the slight changes in this organ as compared with those in the epididymis and cord, and it is suggested that their altered condition hindered the detection of worms which may have lain in them.

C. L.

TALIAFERRO (William H.) & HOFFMAN (William A.). **Skin Reactions to *Dirofilaria immitis* in Persons infected with *Wuchereria bancrofti*.**—*Jl. Preventive Med.* 1930. July. Vol. 4. No. 4. pp. 261-280. [18 refs.] [School of Trop. Med., Univ. of Porto Rico, San Juan, & Dept. of Hyg. & Bact., Univ., Chicago.]

"A large proportion of persons infected with *Wuchereria bancrofti* exhibit a positive immediate skin reaction to the intradermal injection of about 0.025 cc. of a 0.5 per cent. saline extract of dried, powdered *Dirofilaria immitis*. Control tests with other parasitic extracts were negative. Using the possession of pseudopods by the urticarial wheal as the criterion of positiveness, 23 known infected persons showed 19 positives, 56 possibly infected showed 38 positives, 22 probably uninfected showed 1 positive, and 19 known uninfected showed no positives. Using as the criterion of positiveness the possession of pseudopods by the wheal or a wheal 10 mm. or larger in diameter with a concomitant negative to some other parasitic extract, the 23 known infected persons showed 21 positives, the 56 possibly infected showed 46 positives, the 22 probably uninfected showed 1 positive, and the 19 known uninfected showed no positives."

Age has no effect on reaction. Local sensitivity was transferred to 5 of 11 persons by injection of serum of a sensitive person. There were very few delayed reactions. Skin reactions with extracts of *D. corynodes* and of a filaria from a cebus were unsatisfactory.

C. L.

SUAREZ (Jenaro). **A Preliminary Report on the Clinical and Bacteriological Findings in 60 Cases of Lymphangitis associated with Elephantoid Fever in Porto Rico.**—*Amer. Jl. Trop. Med.* 1930. May. Vol. 10. No. 3. pp. 183–198. With 5 text figs. [4 refs.] [Presbyterian Hosp., San Juan, Porto Rico.]

Cultures were taken from 60 patients during acute lymphangitis. In ten cultures taken from septic foci, *Streptococcus haemolyticus* was found 9 times and *Staph. aureus haemolyticus* once. Only 2 of 50 cultures taken from subcutaneous tissues were positive; both for *Strept. haemolyticus*.

"A case of lymphangitis is very rarely seen without a septic focus of infection of the part affected. . . . It is really astonishing the enormous number of lesions found on careful examination of the feet of dispensary patients. . . . From experience I have invariably found that by treating or removing the foci of infection patients remain free of the lymphangitis for months. Microfilariae were never found in the blood of these patients. . . . Filariasis as a factor in production of elephantiasis is not as important as was formerly thought."

C. L.

MINAMI (Seigo) & EHARA (Ichiro). Ueber den positiven Filarienbefund bei einem Fall von Chylurie und die histologischen Veränderungen der Niere bei 2 Fällen. [**Finding of Filaria in One Case of Chyluria and Histological Changes in the Kidneys in Two Others.**]—*Japan. Jl. Dermat. & Urol.* 1928. Mar. Vol. 28. No. 3. pp. 283–303. With 2 text figs. & 4 figs. on 1 plate. [51 refs.] [In Japanese. German summary pp. 14–15.] [Skin Clinic, Univ., Okayama.]

In all the four cases of chyluria described, the leakage of chyle was from the left ureter and the function of that kidney was slightly damaged. Microfilariae were present neither in the night blood nor in the urine. In two the chylous urine coagulated and the left kidney in each had to be removed on account of the discomfort so produced. In one case a female filaria apparently alive was found in a lymphatic gland about the hilum of the kidney, with microfilariae in the fluid about it, so that chyluria without microfilaraemia does not exclude filariasis. The kidneys showed hyaline degeneration of the convoluted tubules, with exuded plasma in the lumen and in many Bowman's capsules. In the literature, it is noted, changes in the kidney are obvious in 76.5 per cent. of chylurias. There was marked dilatation of the lymphatic vessels of and haemorrhage into the submucosa of the pelvis of the kidney and upper part of the ureter.

C. L.

PHELPS (J. R.), SMITH (O. A.), CARROLL (H. H.), WASHBURN (W. A.) & BEAGLEY (K. E.). **Experimental Treatment of Filariasis with Intramuscular Injections of Oil of Chenopodium. A Preliminary Report by the Technical Staff of the Health Department of American Samoa.**—*U.S. Nav. Med. Bull.* 1930. Apr. Vol. 28. No. 2. pp. 459–487.

After general remarks the authors describe the intramuscular injection, usually weekly, of oil of chenopodium, or seemingly ascaridole, into 338 subjects of filariasis about half of whom had microfilariae, here non-periodic, in the blood. "Fresh blood smears are taken from each patient once a week. In many cases bloods formerly positive

every week have become negative after several injections. We can not draw any conclusions from that fact, because there comes a time in many cases when microfilariae disappear from the peripheral circulation, especially in cases where there is elephantiasis." Attacks of filarial fever have usually ceased about the 5th injection and capacity for work has increased. The dosage was 0.5 cc. increasing by weekly increments of 0.5 cc. to 2 cc. into the gluteus. There was often heavy protein shock, namely very severe general reactions with rigors, and a temperature of 103° F. coming on in 24 to 30 hours, and also in a third of the cases severe pain and swelling over the injection. The treatment was most popular.

C. L.

KIDD (Frank). **Surgical Treatment of Chyluria and Filariasis.**—*Brit. Jl. Urol.* 1930. Mar. Vol. 2. No. 1. pp. 15-26. With 1 fig. [24 refs.]

Two cases are described. A woman of 69 who had lived for 30 years in Mauritius in her youth, suddenly showed a *Bact. coli* infection of the right kidney, and later a chyluria coming from that organ. Abdominal nephrectomy revealed no dilated abdominal lymphatics, there was an S-shaped kink in the ureter, the pelvis was a distended sac. The kidney was removed with cure of chyluria and bacilluria. No microfilariae had been found in blood or urine. In the second case the left tunica vaginalis was filled with milky fluid, while distended cord lymphatics contained clear fluid with active microfilariae. After excision of the sac drainage was arranged for and persisted for 3 weeks, discharge then spontaneously ceasing. "In cases of unilateral renal chyluria causing profound wasting or other complications that endanger life or render it unendurable nephrectomy is justifiable." An X-ray picture of a chyluric kidney injected with sodium iodide is reproduced from A. H. WOOD in which the opaque medium is described as entering two lymphatic channels coursing towards the mesial abdominal lymph nodes. "Curiously enough the taking of the pyelogram cured the chyluria" [so that, from whatever reason, the chyluria ceased without operation in this case].

C. L.

BOYD (T. C.) & ROY (A. C.). **The Cholesterol Content of the Blood in Filaria.**—*Indian Jl. Med. Res.* 1930. Jan. Vol. 17. No. 3. pp. 949-951. [2 refs.]

The normal blood cholesterol is 0.116 per 100 cc. In 50 cases with microfilariae in the blood or with filarial diseases it varied between 0.12 and 0.22.

C. L.

CHOPRA (R. N.), CHOUDHURY (S. G.) & RAO (S. Sunder). **Studies in the Physical Properties of Different Blood Sera. Part IV. Filariasis.**—*Indian Jl. Med. Res.* 1930. July. Vol. 18. No. 1. pp. 27-33. [5 refs.] [School of Trop. Med. & Hyg., Calcutta.]

"Density, viscosity, surface tension and buffer action of sera from the blood of normal persons and filariasis patients have been determined. It has been found that the surface tension and buffer action of filariasis sera are somewhat diminished, while density and viscosity are not changed at all."

C. L.

HAGA (J.). Over filariasis in Ned.-Indië, met name op de Westkust van Sumatra en de Zuideren Ooster-Afdeeling van Borneo (Onderafdeeling Zuid-Hoeloe-Soengai). [*Filariasis in Netherlands India.*]—*Geneesk. Tijdschr. v. Nederl.-Indië*. 1929. Aug. 1. Vol. 69. No. 8. pp. 763-771. [1 ref.]

Examinations of thick drop preparations of night blood from 181 persons, mostly prisoners, in four localities on the west coast of Sumatra showed percentages of infection between 3.1 and 39.8 with an average of 26. In the south and east districts of Borneo, from which nine cases are described in detail, filariasis and elephantiasis are widespread. When working on a mass scale the unsatisfactory results obtained by examining 1 cc. of blood lead naturally to the removal by venipuncture of 5 or 10 cc., which can be effected for a large number of persons in a short time if there are plenty of needles and centrifuge tubes. The species of filaria is to be investigated. C. L.

BRUG (S. L.) & DE ROOK (H.). Filariasis in Ned.-Indië. II. De overbrenging van *Filaria malayi*. [*Transmission of F. malayi.*]—*Geneesk. Tijdschr. v. Nederl.-Indië*. 1930. May 1. Vol. 70. No. 5. pp. 451-472. With 18 figs. on 3 plates, 1 text fig. & 2 diagrams. [8 refs.] English summary pp. 472-473.

Taeniorhynchus (Mansonioides) annulipes and *T. (M.) annulatus* acquired experimental infections with *F. malayi* to the extent of 93 and 83 per cent. respectively, the corresponding natural infections being 1.2 and 1.9. In view of the enormous prevalence of these two mosquitoes, even such small indices suffice to explain the widespread filariasis which exists. Probably *T. (M.) uniformis* and *T. (M.) annuliferus* will prove capable of carrying the microfilaria. In *T. coquillettidia giblini* and some *Aedes* and *Culex* no noteworthy development occurred. C. L.

KLOTZ (Oskar). Nodular Fibrosis of the Spleen associated with *Filaria loa*.—*Amer. Jl. Trop. Med.* 1930. Jan. Vol. 10. No. 1. pp. 57-64. With 2 figs. [6 refs.] [Path. Dept., Univ., Toronto.]

The lesions were found in two Africans. *Mf. loa* was found in the blood of one before death; that of the other was not examined. On section the spleens were marbled or studded with pin-point yellowish spots. Microscopically there was diffuse fibrosis becoming denser in places. The Malpighian bodies were very small or had apparently disappeared, the lymphocytes being largely replaced by endothelial cells with fibrosis along the sinus walls. In other parts nodular masses of fibrosis with eosinophils surrounded the sinuses and in the latter many well-stained *Mf. loa* were encountered. C. L.

CHANDLER (Asa C.), MILLIKEN (Gibbs) & SCHUHARDT (Victor T.). The Production of a Typical Calabar Swelling in a Loa Patient by Injection of a *Dirofilaria* Antigen, and Some Comments on the Nature of Calabar Swellings.—*Amer. Jl. Trop. Med.* 1930. Sept. Vol. 10. No. 5. pp. 345-351. [4 refs.] [Rice Inst., Houston, Texas.]

A woman returned to the United States from the Belgian Congo with Calabar swellings and wandering loa worms. One such worm was seized

in the conjunctiva and extracted damaged. It was believed to be a male. There was immediate swelling of the lids and appearance of 3 Calabar swellings—on wrist, shoulder and sole of foot. Injection of 0.05 cc. of a 1 per cent. extract of dried *Dirofilaria immitis* produced in 20 minutes a circumscribed red itchy oedematous swelling about the size of half a hen's egg. In 24 hours two-thirds of the under side of the arm was involved, and the shoulder joint ached. Adrenalin, minimis ij, caused marked improvement within half an hour, which "affords strong, if not conclusive evidence for the allergic nature of these swellings, as first suggested by Fülleborn."

C. L.

LAN-CHOU (Feng). **Experiments with *Dirofilaria immitis* and Local Species of Mosquitos in Peiping, North China with a Note on *Lankesteria culicis* found in *Aedes koreicus*.**—*Ann. Trop. Med. & Parasit.* 1930. Oct. 22. Vol. 24. No. 3. pp. 347-366. With 9 figs. on 2 plates. [7 refs.] [Peiping Union Med. College, Peking.]

"Microfilariae of *Dirofilaria immitis* undergo their development experimentally in *Anopheles hyrcanus* var. *sinensis* and *Aedes koreicus*. The microfilariae pass into the malpighian tubes within one to twenty-four hours after feeding. At a temperature of 25°-28° C. the whole development is completed in ten to fifteen days, and between twelve and fifteen days they proceed forward to the labium. The mature larvae have been seen proceeding to the legs, in the head above the pharynx, and sometimes even in the palpi. At different stages of development, dead and calcified larvae were observed in *A. koreicus*, but not in *A. hyrcanus* var. *sinensis*."

C. L.

- i. NEUBER (Edoardo). Un caso di *Filaria sanguinis hominis* a Hajdunánás (Ungheria). [**A Blood Filaria in Hungary** [P].]—*Giorn. Ital. di Dermat. e Sifil.* 1929. Aug. Vol. 70. Year 64. No. 4. pp. 757-767. With 5 plates. [6 refs.]
- ii. —. *Filaria sanguinis hominis* in Hajdunánás, Ungarn.—*Wien. Klin. Woch.* 1929. Oct. 31. Vol. 42. No. 44. pp. 1398-1403. With 8 text figs. [6 refs.]
- iii. —. Mit Gold- und Malariatherapie geheilte Filariose.—*Ibid.* 1930. Sept. 18. Vol. 43. No. 38. pp. 1165-1167. With 2 text figs.

i, ii. These are the same paper in two languages. The man, aged 57, had never been further from Hungary than Königgrätz, Josefstadt, Albania and Montenegro. He had had fever and rigors and showed a vesicular eruption on penis and scrotum which is illustrated, as also are sections of excised portions of the scrotal skin. Three photomicrographs show structures purporting to be microfilariae, but which appear to be artefacts. [Certainly no one with knowledge and a healthily critical mind would accept them as evidence of filariasis.]

iii. Accordingly the energetic treatment need not here be detailed.

C. L.

GRIGOROWA (O.) & NESTURCH (M.). Filariose bei jungen Schimpansen. [**Filariasis in Young Chimpanzees.**]—*Ztschr. f. Parasitenk.* 1930. Aug. 9. Vol. 2. No. 5. pp. 616-628. With 2 text figs. [11 refs.] [Zool. Gardens, Moscow.]

In the blood of a young chimpanzee in the Moscow Zoological Garden a microfilaria was present corresponding to *Mf. perstans*. Anatomy of stained specimens and relative distances of fixed points confirm the authors' conclusions.

C. L.

RODHAIN & HOUSSIAU (F.). Les infections à *Onchocerca volvulus* chez l'Européen au Congo belge. [*O. volvulus* Infestations in Europeans in Belgian Congo].—*Bull. Acad. R. de Méd. Belgique*. 1930. Feb. 22. 5th Ser. Vol. 10. No. 2. pp. 86–102. [10 refs.]

Five cases of onchocerca nodules in Europeans are noted. The subcutaneous tumours were most numerous where the skin closely overlies bone—the iliac crests, the trochanters, the ribs, the tips of the vertebral spines. In two cases they lay in the palms, but in general had no relation to sites of insect bites. They provoked no cutaneous alteration, but perhaps were associated with irregular pruritus or rheumatic pains. The absence of nodules in natives from whom microfilariæ are obtained, is suggested as evidence that the former are caused by allergic reaction, unless there are two species of worm with indistinguishable and intradermal microfilariæ.

C. L.

HOFFMANN (Carlos C.). Ueber *Onchocerca* im Süden von Mexiko und die Weiterentwicklung ihrer Mikrofilarien in *Eusimulium mooseri*. [*Onchocerca* in South Mexico and Development of Microfilariæ in *E. mooseri*].—*Arch. f. Schiffs- u. Trop.-Hyg.* 1930. Sept. Vol. 34. No. 9. pp. 461–472. With 6 text figs. (1 map). [13 refs.]

The author's experience is in the south of Chiapas, the most southerly Mexican State bordering on Guatemala, in a coffee estate lying at 700 m. Cases appeared about 3 years ago, but all the people now carry microfilariæ in the lymph and 86 per cent. have nodules; accordingly there may be infection without nodules. Of these, 13 per cent. are not in the head—iliac crests, ribs, shoulder blades, collar bone. Not all nodules contain worms of both sexes and a number are "sterile." Microfilariæ are found throughout the body, but are massed about the nodules and those parts exposed to light and air—the face and nape of the neck. After removal of nodules microfilariæ persist in the lymph at least up to 160 days. Hoffmann has once found one in the blood. Eosinophilia is marked and Calabar swellings have been found in a certain number during the first year of infection, but no "coast erysipelas." Blindness he has never seen, and attributes it to neglect of the slight initial symptoms of ocular irritation. Regarding the intermediate host, *Simulium avidum* has not been investigated, *Eusimulium ochraceum* has not been implicated at present, but in *E. mooseri* typical sausage-shaped onchocerca larvae with clearly differentiated rudiments of excretory apparatus, chyle intestine, nervous system and genital apparatus, have been observed in the thoracic muscles after 68 hours.

C. L.

BOLETIN DE LA OFICINA SANITARIA PANAMERICANA. 1930. Nov. Vol. 9. No. 11. pp. 1290–1301. With 2 maps.—Estado actual del estudio de la oncocercosis en México. [*Present State of the Study of Onchocerciasis in Mexico.*]

Investigations were carried out by the Department of Public Health in two states, Chiapas and Oaxaca. The number examined is not

given nor the population, so that the figures lose much of their value. In Chiapas 76 cases were seen, 49 men, 27 women. Cysts were commonest in the head and more than one cyst was the rule, only 19 being solitary. In Oaxaca 59 were found infected, 53 men, 6 women. This preponderance of male cases is due merely to the scarcity of women in onchocerca zones. Thirty-six of the patients had one cyst, 15 had two, the remainder up to five. Maps are reproduced showing the distribution of the cases.

H. H. S.

BRUG (S. L.). *Dracunculus medinensis* in the Dutch East Indies.—*Meded. Dienst. d. Volksgezondheid in Nederl.-Indië*. 1930. Vol. 19. Pt. 1. pp. 153–157. With 11 figs. on 3 plates. [Central Med. Lab., Weltevreden.]

Two doubtful indigenous cases of guineaworm have been reported from the Dutch East Indies, yet there must have been importation of infection over the centuries during which there has been commerce with India and Arabia. Moreover, the almost cosmopolitan *Cyclops leuckarti* is present, and Brug infected it readily with larvae obtained from an Arab, who imported the guineaworm in his body. In this cyclops larval development followed the usual course. Cyclops containing infective larvae were fed to a gibbon, *Hylobates leuciscus*. More than a year later the apparently uninfected gibbon was killed and a full-grown female dracunculus found in the left calf. Many of these gibbons have been dissected after being used for experimental purposes in this laboratory, and no guineaworm has ever been found in them; moreover they drink only tap water in the laboratory, as this monkey had done for 20 months. Accordingly, the most reasonable conclusion is that the adult resulted from the experimental feeding. That being so, the freedom of the country from indigenous infection is attributed to the love of the inhabitants for running water to drink, the drinking of stagnant water being generally agreed upon (LEIPER, 1907, TURKHUDD, 1915) as the principal factor in the spread of the disease.

C. L.

PRADHAN (Y. M.). *Observations on Experiments designed to combat Dracontiasis in an Endemic Area by Col. Morison's Method of 'Lining Wells.'*—*Indian Jl. Med. Res.* 1930. Oct. Vol. 18. No. 2. pp. 443–465. With 4 graphs & 1 plate.

In the Colaba District of Bombay 10 per cent. of the population suffers yearly from guineaworm infection between February and May. In 23 per cent. of these a joint is affected, generally the ankle, leaving a permanent and crippling condition, so that economic waste is enormous. Cyclops lived for 24 hours in potassium permanganate, 2 ounces in 1,000 gallons of water, and such water is undrinkable. Lime (80 per cent. CaO) in a strength of 1 drachm to the gallon was used by removing water from the well concerned and returning it with the requisite amount of lime dissolved in it. The water was potable in 2 days: The process had to be repeated every fortnight as cyclops appear again after that period. In two villages with wells so treated in 1929 the number of infections were 63 and 33 in 1928,

and 26 and 26 respectively in 1929. In two control villages the figures for 1928 were 12 and 24, and for 1929 15 and 26. "Since guineaworm disease is seasonal, liming operations need only be done from February to the end of May to prevent contamination of water by acute cases, so that it would be very economical."

C. L.

MIRZA (M. B.). Beiträge zur Kenntnis des Baues von *Dracunculus medinensis* Velsch. [Structure of *D. medinensis*.]—*Ztschr. f. Parasitenk.* 1929. Oct. 12. Vol. 2. No. 2. pp. 129-156. With 33 text figs. [35 refs.] [Zool. Inst., Univ., Frankfurt a.M.]

Worms were recovered by the time-honoured custom of twisting them round a stick, extraction taking a fortnight. In a few cases it was nevertheless held that a satisfactory reconstruction could be made, if the worms were then preserved in Petrunkewitsch's fluid, namely distilled water 90, absolute alcohol 60, glacial acetic acid 27, nitric acid 3, and perchloride of mercury to saturation.

The examinations confirmed the presence at the anterior end of the worm of 6 papillae in the usual positions and a dorsal and ventral one also. The reconstruction has a remarkable resemblance to the well-known figure consistently copied from LEUCKART, and the axial uterus with its now functionless terminal ovarian tubes is re-described. The tripartite muscular oesophagus, typical of myosyringata, is marked in its anterior end, but more posteriorly the three oesophageal glands, particularly the dorsal one, take massive proportions; and the considerable cavity of the dorsal gland opens anteriorly by its duct into the oesophageal lumen. Posteriorly the oesophageal lumen with its cuticular lining was in these extracted worms sometimes lost, sometimes present beside or within the glandular structure.

C. L.

MAKEL (H. P.) & DE VAULT (V. T.). **Dracontiasis—Case Report.**—*Milit. Surgeon.* 1930. Nov. Vol. 67. No. 5. pp. 600-604. [3 refs.]

A "Hindu" who had left India 4 months was admitted to Colon Hospital, Panama, with a supra-pubic superficial inflammatory mass from which, on incision, were removed two thread-like structures each 7 cm. long. "Attempts to determine the internal structure of the filaments both in the gross and the microscopic, were unsuccessful." The tissues showed giant cells, fibroblasts with sclerosis, occasionally leucocytes and eosinophils. [In the circumstances the certainty suggested by the title is a pity.]

C. L.

CHAIGNEAU (Y.). Quelques considérations sur la formule leucocytaire et le traitement par le kermès des tirailleurs atteints de dracunculose. [**Leucocyte Formula and Treatment by Kermès of Guineaworm among Tirailleurs.**]—*Ann. de Méd. et de Pharm. Colon.* 1930. Jan.-Feb.-Mar. Vol. 28. No. 1. pp. 81-85. [5 refs.]

Kermès is a tersulphide of antimony; it was given in doses of 0.4 gm. daily, drunk in water, and was held to expedite delivery in all but one of eight worms. The percentage of lymphocytes and medium mononuclears ["moyen monos"] lay between from 42 and 48.

C. L.

PENSO (Giuseppe). Osservazioni ed esperienze sull' "*Anguillula aceti*." [Case of *Anguillula aceti* Infestation.]—*Ann. di Med. Nav. e Colon.* 1930. Mar.-Apr. Year 36. Vol. 1. No. 3/4. pp. 167-177. With 13 figs. on 2 plates. [28 refs.] [Inst. of Med. Parasit., Univ., Rome.]

A child of 6 was suspected of threadworms. The result of an enema of acetic acid and water disclosed *Anguillula aceti* which is described and pictured and the literature reviewed.

C. L.

NIESCHULZ (Otto) & HOFKAMP (H. St.). Ueber den Wert der sog. D.-C.-F.-Methoden von Lane als Anreicherungsverfahren für Nematodeneier und Kokzidienzysten. [The Value of Lane's D.C.F. Method for Nematode Eggs and Coccidial Cysts.]—*Deut. Tierärztl. Woch.* 1930. Feb. 22. Vol. 38. No. 8. pp. 116-117. With 1 text fig. [6 refs.] [Inst. for Infectious Diseases & Parasit., Utrecht.]

The authors comment on the lack of mention of D.C.F. in veterinary literature. Nieschulz has used it as a routine means of parasitological investigation of faeces for a year, at the State Veterinary Institute at Buitenzorg, Java, and at Utrecht. The method used is described as a modification of LANE's, whose purpose was mass diagnosis for which a special centrifuge was devised. The authors describe a small bucket usable with the ordinary medical centrifuge with 0.5 cc. of stool. Speaking evidently of dog's faeces they report that eggs and coccidial cysts are very quickly and easily found, so that a negative diagnosis can be made in at most 2 minutes. They describe the method as simple, absolutely certain, needing no costly apparatus, and quickly and cheaply carried out. It is summed up as a method which is strongly recommended to all veterinarians. The exact comparisons of D.C.F. with other methods, on which these opinions are largely based, are being published by HOFKAMP.

[In papers dealing with mass diagnosis stress was naturally laid on a suitable heavy instrument, but the writers have overlooked Fig. 3, *Trans. Roy. Soc. Trop. Med. & Hyg.* (1924), Vol. 17, and the comment on p. 410 that the short bucket there described "makes the technique cheaply available for use in any centrifuge provided the D-aperture in its head be roomy enough to take the horns and cover and provided 0.5 cc. of stool be used."]

C. L.

CALDWELL (Fred C.), CALDWELL (Elfreda L.) & DAVIS (Gordon E.). Some Aspects of the Epidemiology of Infestation with *Trichuris* and *Ascaris* as revealed in a Study at the Hospitals for the Insane and the Home for Mentally Defective Children in the State of Alabama.—*Amer. Jl. Hyg.* 1930. May. Vol. 11. No. 3. pp. 619-651. With 5 text figs. [20 refs.] [Field Research Lab., Internat. Health Division, Rockefeller Foundation, Andalusia, Alabama.]

Determination of infection was by "the salt flotation method" [whether direct or indirect, gravity or centrifugal, with their varying degrees of accuracy, is unstated]. Counting was by the Caldwell's method on stools conveyed to a central laboratory and there kept on

ice till examined. Comparison of the amount of infection with the period of residence showed that infections with ankylostomes, ascaris and trichuris, particularly the last two, were all being acquired in the institutions concerned. Patients were mainly warded with those of like behaviour, and it was in wards of patients with dirty habits that the amount of infection was greatest with ascaris and trichuris. Moreover infection was evidently acquired in the apparently clean ward yards where as many as 5,000 eggs of ascaris and trichuris were isolated from 100 gm. of soil. Age, sex, colour, and kind of mental disease had in themselves no importance in determining acquisition of infection. Ascaris was far less frequent than trichuris infection and, the mode of infection being held identical, the fact is not considered as explicable by any one proved factor.

C. L.

TORRES (C. Magarinos) & VILLELA (E. Libanio). [In Portuguese & French.] Nematodios imaturos, parasitos erráticos e desgarrados encontrados nos tecidos do homem. Némathelminthes parasites erratiques et égarés trouvés dans les tissus de l'homme à Rio de Janeiro (Brésil). [Erratic Nematodes found in Human Tissues at Rio de Janeiro.]—*Mem. Inst. Oswaldo Cruz*. 1929. Vol. 22. In Portuguese pp. 161–167. With 8 plates. In French pp. 168–174. [3 refs.]

Four cases are described. 1. An Agamofilaria coiled up onchocerca-wise so as to form a yellowish subperitoneal nodule 1 cm. by 1.5 cm. at the outer border of the left kidney. On section the nodule emitted a purulent fluid and contained a nematode cut a score of times. 2. Two fibrous nodules in the epididymis, the smaller containing in a central cavity a larval nematode. 3. What is taken to be a larval nematode which was found in the endometrium surrounded by eosinophils. 4. Inflammatory nodules in the liver believed to surround eggs of a helminth.

C. L.

WÜLKER (G.). Die Entstehung des Parasitismus bei den Nematoden. [The Origin of Parasitism in the Nematodes.]—*Beihefte z. Arch. f. Schiffs- u. Trop.-Hyg.* 1929. Vol. 33. No. 3. pp. 188–200 (272–284). With 3 text figs. [21 refs.]

A general survey of parasitism and discussion as to its means of establishment.

C. L.

MATOSI (R.). Die Verbreitung der Askariden in Zürich und Umgebung. (Beitrag zur Askaridenenquete in der Schweiz.). [Ascariasis in Zurich and its Suburbs.]—*Schweiz. Med. Woch.* 1930. Oct. 4. No. 40. pp. 941–942. [5 refs.] [Children's Clinic, Univ., Zurich.]

The stools of 1,000 children between 6 and 10 were examined, by the Galli-Valerio method, *i.e.* by the use of a properly diluted faecal suspension in 2 per cent. commercial formalin. The suburbs showed an infection percentage of 48, the country 39, and the town itself 28.

Infection increased with age of the child. The greater prevalence in recent years is attributed to the growing habit of eating raw food [vegetables?].

C. L.

BLACKIE (William K.). **Histological Observations on Experimental Ascariasis.**—*Jl. Helminthology*. 1930. June. Vol. 8. No. 2. pp. 93–102. With 3 text figs. [School of Hyg. & Trop. Med., London.]

These observations refer to lesions caused in liver, lungs and kidneys by larvae of *Ascaris megalocephala* during their migrations in rabbits, guineapigs, and mice, there being no essential difference in the effects caused in these 3 hosts. The animals died or were killed 3 to 7 days after an infective feed of many thousands of embryonated eggs. In the *lungs* intra-alveolar haemorrhage is the essential lesion, with large mononuclears actively phagocytic of red corpuscles and nearly always containing a finely granular, dark brown, iron-containing pigment. There are also cell clusters containing eosinophil, small round, and larger cells often surrounding a haemorrhage which sometimes contains a larva. Larvae may be found in alveoli where they seem to be undergoing dissolution, or in their walls. In the *liver* parenchyma degeneration is general but is most marked round the intralobular vein. It varies from cloudy swelling to necrosis; and in an animal dying of infection no cell may be normal, so that hepatic insufficiency must contribute largely to death. There are cell clusters, too, mainly at the periphery of the lobules, eosinophils comprising about three-quarters of the cells but being also scattered through the liver and predominating in its blood vessels. These foci are rarely in relation to a larva. In the *kidneys* no larvae were found. The glomeruli are congested. Between these and the loop of Henle there is moderate cloudy swelling. From the loop of Henle to the end of the junctional tubule the cells are extensively necrosed, with their lumina containing debris or casts. The kidney being remote from the migratory route these changes must be toxic, and their extent contributory to death. "More conclusive evidence of the presence of a larval toxin is to be found in the demonstration of immune body in the serum of rabbits during the stage of larval migration."

C. L.

EMERY (Frederick E.) & HERRICK (Chester A.). **The Effects of Extract on Circulation and Respiration.**—*Amer. Jl. Physiol.* 1929. Dec. 1. Vol. 91. No. 1. pp. 143–149. With 4 text figs. [15 refs.] [Depts. of Physiol. & Zool., Univ. of Wisconsin, Madison.]

"Changes in circulation and respiration produced by extracts of the pig ascaris have been studied on etherized dogs and cats under chloralose anesthesia.

"The ascaris extract has a strong depressor effect on blood pressure. The heart rate is not appreciably altered.

"The respirations were somewhat deeper with little or no change in rate.

"Plethysmograph records show that the volume of the spleen, liver and of the intestine fell with the blood pressure. The volume of the leg increased.

"The ascaris extract produced irritation to the skin and respiratory passages in man.

"The histamine like properties of the extract are discussed."

C. L.

ISHIKAWA (S.). **On the Fate of the Ova of the Ascaris in Heaped Manure mixed with Human Faeces, and the Investigation of the Eggs adhering to Vegetables.**—*Jl. Oriental Med.* 1929. Oct. Vol. 11. No. 4. pp. 127-131.

"Heaped manure" in Manchuria means human or pig and sometimes other faeces collected round houses when more or less dry, softened with water, mixed well with "dirt," and made into bricks which after drying for about 5 days are stacked till used. Nevertheless the inner part of a brick retains moisture and viable ascaris eggs were obtained from it even after exposure to summer heat and severe winter cold. Vegetables manured with this fertilizer carried ascaris eggs. Pickled vegetables carried fewer than fresh ones, but whether the eggs were viable or not was not ascertained.

C. L.

FISHBACK (Hamilton R.). **Experiments with Certain Reactive Factors of Ascaris.**—*Jl. Infect. Dis.* 1930. Oct. Vol. 47. No. 4. pp. 345-354. With 1 text fig. [21 refs.] [Med. School, Northwestern Univ., Chicago.]

In this paper Fishback points out that anaemia is a common accompaniment of ascaris infections of human beings, and that the haemolytic action of the worms and their products has been much studied. Evidences of allergic activity resulting from ascaris infestations are also cited. Three antigens derived from dry powdered ascaris substance were used in various experiments, namely, a saline extract, a methyl alcohol extract and an acetone-insoluble alcohol-soluble extract. No distinction was drawn between *Ascaris lumbricoides* and *Ascaris suilla* as a source of antigen. The haemolytic effects of these extracts on human red blood corpuscles, their oxytotic action on the sensitized guineapig uterus, their capacity to induce skin reactions and the modifying effects of immune sera on these three types of activity were all investigated.

All the extracts possessed a strong but variable haemolytic action on human red blood corpuscles, and small doses of serum derived from rabbits immunized with ascaris substance completely inhibited haemolysis.

Uterine strips from sensitized guineapigs responded specifically to ascaris extracts, but after incubation with immune serum the acetone-insoluble, alcohol-soluble extract caused no uterine contraction though the saline extract remained active. This residual exciting factor was considered to be related to its protein content. In an allergic human subject the results of intradermal tests with ascaris extracts were positive, and here also the reactivity of the acetone-insoluble, alcohol-soluble extract was neutralized by immune serum though not the saline extract. The immune content of the serum was thus specific for ascaris haemolysin and for the oxytotic and skin reactive factors contained in the acetone-insoluble alcohol-soluble ascaris extract, but was ineffective against the saline extract.

N. Hamilton Fairley.

SCHMELEWA (A. A.). Der Einfluss der Wasserstoffionenkonzentration des Mediums auf die Entwicklung der Askarideneier. [**Influence of pH of Medium on Development of Ascaris Eggs.**]—*Rev. Microbiol., Epidemiol. et Parasit.* 1929. Vol. 8. No. 3. pp. 319-324. With 3 text figs. [18 refs.] [In Russian. German summary pp. 360-361.]

No effect on development of ascaris eggs was noted in solutions varying in pH from 3 to 8, although the albuminous coat of *A. lumbricoides*, including *A. suilla*, was dissolved when this exceeded 5 and that of *Parascaris equorum* after 24 hours in solution of any acidity.

C. L.

MORETTI (Giulio). Osservazioni sul tragitto degli ascaridi attraverso la parete intestinale dell'uomo. [**Passage of Ascarids through the Intestinal Wall of Man.**]—*Pathologica.* 1930. Apr. 15. Vol. 22. No. 462. pp. 188-195. With 4 figs. on 1 plate. [38 refs.]

In a purulent peritonitis with an ascaris free in the abdominal cavity, there was found 3 cm. above the ileocaecal valve a perforation 2 mm. across, in the production of which mechanical and chemical action by the worm are considered as active agents. Seven other worms were found in the alimentary canal.

C. L.

DUFOSSE. Perforation intestinale révélée par l'issue d'un ascaris. [**Intestinal Perforation disclosed by Egress of Ascaris.**]—*Bull. Soc. Méd.-Chirurg. Indochine.* 1930. Jan. Vol. 8. No. 1. p. 89.

In a woman whose husband had put a knife blade 6 cm. long into her abdomen, two intestinal wounds were found and sutured. Examination of neighbouring coils showed no further injury, but an ascaris was seen and found to be escaping from yet another perforation which was then dealt with. Santonin ten days later expelled two ascaris and she left hospital 15 days after operation.

C. L.

i. POWER (R. Wood) & JOHNSTON (H. W.). **A Case of Ruptured Empyema of the Gall-Bladder associated with *Ascaris lumbricoides*.**—*Brit. Med. Jl.* 1930. June 14. pp. 1086-1088. [35 refs.]

ii. HARE (Tom). **Invasion of the Gall-Bladder by *Ascaris lumbricoides*.** [Correspondence.]—*Ibid.* 1930. July 5. p. 42.

i. A ruptured empyema of the gall bladder caused general peritonitis. No ascaris was found in the gall bladder or peritoneum, but 4 were passed per anum. It is held probable that if there had been worms and ova in the gall bladder they would have undergone disintegration in the pus.

ii. Hare points out that two specimens in the museum of the Royal Veterinary College show migration of ascaris in the pig in the bile ducts, hepatic ducts and gall bladder. The last and the pancreatic duct are however but rarely entered in swine.

C. L.

CEPPI (Ernest). L'ascaridiase complication grave d'une opération relative-ment simple. [**Ascariasis complicating an Operation.**]—*Schweiz. Med. Woch.* 1930. Nov. 8. No. 45. pp. 1054-1055.

A caesarian section was followed by persistent vomiting and the expulsion one by one over a number of days of 17 ascaris by the mouth and three by the anus. There is no note of the giving of an anthelmintic

during this period of prolonged straining which burst open the abdominal wound, fortunately without serious result.

C. L.

LANE (Clayton). **Gauging the Hookworm Load of a Community.**—*Lancet*. 1930. May 3. pp. 978–981. [15 refs.]

In effect the question is asked: Do the customary egg counts, as now carried out before and after a hookworm campaign, really gauge the hookworm load of a community? and the answer given is No. For these reasons. Not only anthelmintics but illness of the host may disturb oviposition. Of two men with the same hookworm load, he passing the smallest stool will appear from egg counts to have more worms than the other: children have small stools and there is no reason to suppose that their hookworms are less fertile than those of adults; they should not be included in such counts. As LOOSS showed nearly 30 years ago just-mature worms lay few eggs, a fact now confirmed for hookworms of dogs and cats; where then infection is seasonal the same number of worms may produce quite different egg counts at different seasons.

An allowance for stool consistence is now almost invariable, the number of eggs per gram of mushy stools being multiplied by 2, and of liquid stools by 4, and the whole thereby expressed as if all stools were solid. The need to do so is essentially based on counts of 7 stools only, 4 solid, 2 mushy and 1 liquid; only in 3 of them was there re-examination to determine whether all worms had been expelled and in those 3 the technique used could not in fact determine that point. Even in these seven cases then the number of eggs counted did not necessarily come from the number of worms recovered. Moreover there is no agreement among others who have separately investigated the matter as to the allowance necessary for stools of different consistencies. His own experiments show that a liquid stool may have less water than a mushy one, and a mushy stool less water than a solid one, so that there is no relationship between stool consistency and water content. There is then no foundation in fact for treating egg counts by a consistence formula; indeed HERRICK found that to do so in dogs' faeces made his results erratic, and AUGUSTINE and colleagues were led to the impossible conclusion that in Egyptian stools the same faecal material in mushy stools diluted hookworm eggs twice and ascaris eggs three times as compared with formed stools.

Yet again, SARLES has shown for *A. caninum* in the dog that as infections increase in weight each hookworm lays fewer eggs. Lane has analysed work by HILL on 93 persons and showed that when a man harboured an average of 111 female necators, the average daily egg output of each was 4,000, the corresponding figure for 444 worms being 2,500 and for 897 being 1,500. When worms were increased eight-fold, the eggs they laid increased less than three-fold. Egg output does not then run parallel with the number of worms harboured, and egg counts do not really measure the worm load of a community. In inquiring whether ancylostomes lay more eggs than necators it is held, on grounds cited, that many of the conclusions are precarious, but that it will probably prove that they lay about twice as many.

It is added that while for certain investigations accurate egg counts are essential and have in the past been of the greatest value, yet "as usually undertaken with the idea of obtaining the real measure of the worm load of a community, particularly the load before and after

mass treatment, it must be concluded in our present state of knowledge that they are, in spite of their reassuring appearance of accuracy, a waste of time and money."

C. L.

LANE (Clayton). **Behaviour of Infective Hookworm Larvae.**—*Ann. Trop. Med. & Parasit.* 1930. Oct. 22. Vol. 24. No. 3. pp. 411-421. [7 refs.]

This is part of work carried out under grants from the Royal Society. Lane, after quoting PRZIBRAM'S definition of a tropism or taxis, describes observations made on infective hookworm larvae in deep glass cells, in capillary tubes and in films, and the animal's reactions to physical and chemical activation. He finds no evidence of rheotaxis or thermotaxis, but considers that purely mechanical conditions suffice to explain the orientation of passive larvae in gentle currents, and the accumulation of active larvae in angles and at points where heat is applied.

"These observations and this reasoning lead then to the conclusion that there is no adequate evidence for the existence in hookworm larvae of any taxis other than thigmotaxis, the result of actual contact, and that observations which have been held to suggest the contrary are explicable on purely mechanical grounds. They lend little countenance to any departure from what seems to have been Looss's opinion. They may be summarized conveniently if dogmatically by the statement that the behaviour of a larva is not complicated. It comprises automatic movement of a kind which will enable it to reach its normal host; movement which is capable of intensification by disturbance through that host's foot, by the heat of his body and perhaps by his specific body fluids, and of conversion into a thigmotaxis by the resistance to entry offered by that host's skin. Nothing more seems necessary to explain observed larval behaviour, and nothing more to be implicit in it as observed."

C. L.

STILES (C. W.). **Decrease of Hookworm Disease in the United States.**—*Public Health Rep.* 1930. Aug. 1. Vol. 45. No. 31. pp. 1763-1781. [Refs. in footnotes.]

Stiles has collected figures of the incidence of hookworm infection in the southern of the United States, all methods of diagnosis being massed together. The percentage was 33 in 1910-14 and 28.1 in 1929, so that hookworm infection is still widespread. He points out that the questions of soils or of carriers are no new ones in hookworm infection, that the carrier may become a patient, that he is a potential danger to all, and that a light infection may be the "last straw" in illness from other causes. He contrasts the way in which the malaria and hookworm carriers are being viewed by certain hygienists at the present time; for they clearly hold that "known carriers of malaria owe it to the community and to themselves to free themselves from malaria, but known carriers of hookworm are to be eliminated from treatment and to be advised that they do not owe it to the community or to themselves to free themselves from hookworms in spite of the ease of treatment." He deals shrewdly with mathematics in hookworm literature. Regarding the conclusion that 25 hookworms or less are no burden to the host, he says of the figures on which it is based "the conclusion might be drawn that it is better for an Alabama white

school child to have 26 to 100 hookworms than 1 to 25 or none at all." "Many of us 'oldsters' who look upon symptoms as not beneath our notice, have seen patients improve in health after expelling less than 25 hookworms." Speaking again of this arbitrary mathematical division:

"I am a firm believer in mathematics. For instance, if I drive at the average rate of 25 miles per hour it will take me 4 hours to cover the distance between two towns 100 miles apart by the State highway—that is, if there is no variable, such as punctures, blow-outs, lack of gas, oil, or of water, collision, broken springs, detours, friendly debates with State police, etc. But I recognize my automobile as subject to variables . . . and somehow it is very difficult for me to break the habit, contracted in student days, of giving at least some consideration to the great variable in this disease, namely, the human being who harbours the worm." These are his views on mass treatment: "The comparison with livestock, the home of mass treatment, fairly represents my idea on the subject of mass treatment, namely, in a locality where human life is more or less valuable, as in civilized countries, it is only in restricted instances, and under very special precautions that I personally would be willing to assume responsibility for mass treatment; but in semi-civilized or uncivilized regions, where human life is cheap, where men, women, and children are little above livestock, and where it is a choice of much greater good by means of mass treatment or a much lesser good by individual treatment, I would be governed by a conservative interpretation of the conditions as I saw them."

C. L.

HAVENS (Leon C.) & CASTLES (Ruth). **The Evaluation of the Hookworm Problem of Alabama by Counties.**—*Jl. Preventive Med.* 1930. Mar. Vol. 4. No. 2. pp. 109–114. With 2 text figs. [3 refs.] [Labs. of Alabama State Board of Health, Montgomery.]

In Alabama there have been made egg counts of 31,991 persons using the Caldwell's egg counting method, selected because it "is simple, comparatively rapid and readily adaptable for practical use in public health laboratories." Its accuracy is apparently accepted without question. The counties are charted as falling in four grades of infection after using Chandler's "weighted means of the counts of the individuals examined."

C. L.

SCHAPIRO (Louis). **Hookworm Infestation in an Indian (Guaimi) and Non-Indian Population of Panama.**—*Amer. Jl. Trop. Med.* 1930. Sept. Vol. 10. No. 5. pp. 365–373. With 1 fig. [3 refs.]

Guaimi Indians defaecate only in running water; the non-Indians of Panama defaecate everywhere. The Indians lead an isolated existence except for a period of four months a year when they cultivate and harvest the lands of non-Indians. Judged by Stoll's method the percentage of persons infected is high in both—99.3 in Indians and 95.8 in non-Indians, though [anomalously] average egg counts vary in the opposite direction, namely 3,372 and 11,296 per cc. of faeces. In non-Indians the weight of infection as judged by these counts rose at a constant rate as the haemoglobin index fell, while among Indians it remained fairly constant. Since the incidence of malaria is prac-

tically the same among both races, faulty nutrition is held to be, presumably, the anaemia-controlling factor among the Indians who lead a precarious existence on a deficient diet and are anaemic apart from detected helminthic infection. The facts suggest that the worm burden an individual may carry without showing anaemia varies greatly in different races and in different areas.

C. L.

BENARROCH (Elías). La anquilostomiasis y otras parasitosis intestinales en el estado Bolívar. [*Ankylostomiasis and Other Helminth Infestations in Bolívar State (Venezuela).*]—Reprinted from *Bol. Cámara de Comercio de Caracas*. 2 pp. [3 refs.] English summary. [Undated, ? 1930.]

Examination was by Willis's direct gravity floatation method in 572 cases. Of these 57 per cent. were positive for hookworm eggs, the different localities giving figures between 40 and 70 per cent. A report of 17 per cent. from 238 examinations made at the Hospital Ruiz on men coming from all over the state is attributed to the use of a less accurate diagnostic method. *Ascaris* and *trichuris* eggs were found in 53 and 54 per cent. respectively.

C. L.

MAPLESTONE (P. A.). *Seasonal Variation in Hookworm Infection.*—*Indian Jl. Med. Res.* 1930. Oct. Vol. 18. No. 2. pp. 685–698. With 6 charts in text. [10 refs.] [School of Trop. Med. & Hyg., Calcutta.]

The assumption underlying this paper is that egg counts [the method of counting is not stated] are a reliable measure of the number of worms harboured. In this abstract the facts are separated from that assumption. In a Calcutta central jail 56 persons showed an average count per gram of 1,271 in November, 1927. Those still remaining in the jail were recounted monthly. The average number of eggs fell steadily to 928 in February, rose fairly steadily to 2,222 in May, fell fairly steadily to 1,328 in September, 1928, being still above the figure of 11 months earlier, and fell to 723 next month. It is concluded that there was an increase of infection corresponding to the May rise and that it must have occurred outside the jail walls, presumably in the jail garden. Similarly in two Dooars tea gardens average egg counts on the same persons from June, 1928, to November, 1929, were: June, 1,258; November, 653; March, 526; June, 1,002; November, 577. The counts were highest in June and lowest in November, and the numbers of persons still available fell from 784 to 530. On ten occasions between February, 1929, and February, 1930, a hundred stools were collected promiscuously on each of two tea gardens in Sylhet and eggs were counted. The number of eggs was highest in May or July and lowest in February. It is concluded from a concomitant study of the rainfall that the monsoon rain is the principal factor in limiting the amount of hookworm infection. Maplestone adds "Chandler (1926–28) in his numerous papers on hookworm infection in India has applied corrections to his figures on the assumption that November is the time of maximum infection and April and May about the minimum. It is shown in the present paper that for Bengal and Assam at all events the reverse appears to be the case." He points

out how much more work must be done before such generalizations can be applied, work on rainfall, soil, climate and other matters.

C. L.

SWEET (W. C.). A Survey of Mysore State for Enlarged Spleens and for Hookworm and Other Helminthic Infections.—Mysore Dept. of Health. Bull. No. 7. Bangalore. 1929. 53 pp. With 2 maps, 1 chart & 11 figs. [9 refs.]

Between July 22nd, 1927, and October 1st, 1928, 11,972 faecal specimens were examined by Stoll's egg counting method, with allowance more elaborate than usual for consistency and, if no eggs were found, by Willis direct gravity floatation. In each of the 8 districts of the State from about 1,000 to about 2,000 persons were dealt with. The average percentage of infection over the whole investigation for each kind of worm, and the average greatest and least percentage infections for each district which this technique detected were as follows: Hookworm 59.4, 85.1, 50.2; ascaris 34.2, 74.4, 7.0; trichuris 14.1, 42.4, 0.5; threadworm 2.6, 4.5, 1.4; *H. nana* 1.0, 0.2, 2.9; trichostrongylus 0.4, 1.7, 0.1; taenia 0.05, 0.2, 0.07, there being none found in 5 States. Judged by Stoll's method the corresponding figures for egg counts per infected person were: Hookworm 1,600, 2,100, 500; ascaris 14,700, 20,800, 4,800; trichuris 1,400, 3,000, 500. There are added corrections for age and sex using as a basis "the age and sex composition of the population of Porto Rico by the 1910 census." Females have more and greater infections with ascaris and trichuris than males; in the case of hookworms there is little to choose; rainfall has no demonstrable effect.

C. L.

- i. **ROBERTSON (E. A.). Notes on the Incidence of Hook-Worm Infection of School-Children in the Kuala Lumpur Area.—Malayan Med. J. 1929. Dec. Vol. 4. No. 4. pp. 137-138. [2 refs.]**
- ii. **GREY (J. C. P.). Roundworm and Hookworm Infection among Malay School-Boys—a Survey of the Krian District, with a Note on Mass Treatment in the Schools.—Ibid. pp. 138-141. [10 refs.]**

i. Examination by smear of 458 children suspected of harbouring worms showed a percentage of infection with ankylostomes of 12 and with ascaris of 53. But in a routine examination of 220 school children by a modified Willis technique [direct gravity floatation] 61 per cent. were found infected with hookworm, 85 per cent. with ascaris, and 88 per cent. with trichuris. Even so Robertson notes that the method of investigation was very rough.

ii. Using in this case the faecal smear only, it was found that 86.5 per cent. of 684 unselected school children were infected with ascaris and 5.8 per cent. with hookworms, and it is concluded that it can properly be assumed that the figures hold good for the adult population of Krian living under kampong conditions. Oil of eucalyptus and chloroform was tried as a vermifuge since it was recommended in "Manson's Tropical Diseases." Because it was found unpleasant and unreliable it was given up in favour of small doses of oil of chenopodium (minims iv for older boys). This was popular and impressive

since many boys passed round worms. The actual anthelmintic value was not tested.

C. L.

PORTER (Annie). **Cockroaches as Vectors of Hookworms on Gold Mines of the Witwatersrand.**—*Jl. Med. Assoc. South Africa*. 1930. Jan. 11. Vol. 4. No. 1. pp. 18-20.

In 221 specimens of *Blatella germanica* no evidence of ingestion of hookworms eggs was obtained but it is questionable how many specimens came from the mine workings and how many from the surface. Of 97 *Periplaneta americana* there were 8 in which "detailed morphological and biometric examination showed that larvae and ova [in their intestinal contents] were those of *Ancylostoma duodenale*." They came from 4 adjoining mines and when caught had fed naturally. *P. americana* is a strong flier and rapid runner. Experiments with prettily painted *B. germanica* showed that they can travel from point to point for several hundred feet and "leave a trail of hookworm ova en route should they have ingested infected faecal material."

C. L.

CALLERIO (Giovanni). Sulla diffusione dell' anchilostomiasi in Provincia di Pavia. (Osservazioni epidemiologiche, cliniche e terapeutiche.) [**Hookworm in the Province of Pavia.**]—*Boll. Soc. Med.-Chirurg. di Pavia*. 1930. Vol. 44. No. 4. pp. 521-535. [16 refs.]

Hookworm has been known to exist in Pavia for the past 50 years. The numbers of persons examined were small, but figures are given for the years 1925-28 and for 1929-30. During the former of 402 men examined 4 were found infected, and one only of 391 women. During the latter period 10 infections were found among 248 men, and 8 among 227 women. The percentage infection of men has thus increased from 1 to 4.3 and of women from 0.25 to 3.52. A map shows the towns in the province where hookworm has been found according to TIBALDI's records made in 1923 and those of the author in 1929-30.

H. H. S.

COLBY (Charles DeWitt) & SCHAFFLE (Karl). **Tuberculosis and Uncinariasis: an Analysis of Sixty-Eight Cases.**—*Southern Med. Jl.* 1930. Sept. Vol. 23. No. 9. pp. 801-807. With 5 text figs.

The authors recount cases in which tuberculosis was diagnosed but the signs cleared up after hookworm infection was established diagnostically and cured. Diagnosis was by a dilute smear, described as Stitt's technique. Treatment was by "iron sulphate in the dose of 0.320 gm., p.c." It is added without evidence offered as to disinfection: "Ferric sulphate is efficient as a vermifuge for hookworms, whipworms and roundworms, and is safe and free from discomfort in the treatment of weak and emaciated individuals." [As yet there appear to be no references to sulphate of iron as a vermifuge in man.]

C. L.

GARIN (Ch.), ROUSSET (J.) & GONTHIER (B.). Les fonctions gastriques dans l'ankylostomose. [*Gastric Functions in Ankylostomiasis.*]—*Lyon Méd.* 1930. July 6. Vol. 146. No. 27. pp. 3-9. [3 refs.]

By a modification of Telemann's concentrative technique (this *Bulletin*, Vol. 25, p. 936) the authors counted the eggs collected on an area of 22 by 22 mm., and by an unstated anthelmintic expelled worms. The table of the 57 persons examined shows great anomalies. In one case one worm produced 63 eggs, in another 60 worms produced 30 eggs only, in yet another 56 worms produced 1,858 eggs besides 144 reported as being found in the stomach contents. It is not noted whether attempt was made by this diagnostic method to determine that the anthelmintic had disinfested. It is concluded that neither the number of worms (held to be fixed to the duodenum) nor the anaemia influenced the gastric acidity.

C. I.

HUART (A. J.). On the Causes of Anaemia in Ankylostomiasis.—*Acta Leidensia (Scholae Med. Tropicae)*. 1929. Vol. 4. pp. 48-109. [84 refs.]

From a most valuable critical survey of the apposite literature and from his own experiments, Huart concludes that the anaemia of ankylostomiasis, at least in the dog, is the result of persistent intestinal bleeding. His conclusion rests on the following. The literature shows that blood is present in the worms if these are examined immediately after death, although a few hours later they contain none. Again the anterior part of the worms contains an anticoagulin, which must make for bleeding; but there is no clear evidence for a haemolytic substance in them. Certainly alcoholic and ethereal extracts of worms may produce haemolysis, but the same effect may be produced by all normal organs living or dead. That a toxin is excreted by the worm and absorbed by the host is made certain by the occurrence of eosinophilia, and by the frequent occurrence of nephritis and chloride retention with oedema in cases of severe ankylostomiasis in man; but that it causes the anaemia there is no proof.

Huart used dogs 1 to 2 months old each weighing about 3 kg. Each received many larvae of *A. caninum* and *A. braziliense* in a gelatin capsule. In about 10 days an acute fulminating anaemia set in; in one case it was immediately fatal; it was not proportional to the number of worms recovered after death; it was accompanied by no sign of increased haemolysis, by no bilirubin in the serum; no complement fixation was detected. Onwards from the ninth day after infection spectroscopic examination of the faeces showed much haemochromogen, although the dogs had been for a week on a diet free from meat and chlorophyl. There was often so much haemochromogen as to imply a very considerable loss of blood. Haematoporphyrin was rare. A typical postmortem finding is the following. Before infection red corpuscles were 5,870,000, twenty days after infection 1,930,000. This dog died on the 34th day; immediate autopsy showed 1,876 full grown ankylostomes, 75 per cent. of them being full of blood; there was a large amount of coagulated blood in jejunum and ileum, and the mucous membrane was sown with haemorrhagic bites. In four of five cases in which it was examined, the bone marrow of the femoral

shaft consisted of fatty tissue to the extent of only one-quarter to one-third, and had blood-forming tissue richly distributed in this.

C. L.

FÜLLEBORN (F.) & KIKUTH (W.). Wie entsteht die Anämie bei Hakenwurminfektion? [**The Origin of Anaemia in Hookworm Infection.**—*Beihefte z. Arch. f. Schiffs- u. Trop.-Hyg.* 1929. Vol. 33. No. 3. pp. 171–186 (255–270). With 1 text fig. [22 refs.]

The literature is reviewed and certain experiments recounted. A dog weighing 5.2 kg. was given 17,000 larvae of *A. caninum* on two consecutive days. Within 16 days its haemoglobin fell from 110 to 35 and its weight to 4.9 kg. When killed after that period 1,100 adult but not yet ovipositing worms were found in bloody slime in the intestines whose contents contained iron corresponding to 290 cc. of normal or 455 cc. of the impoverished blood. The bowels had not been opened for 3 days so these figures corresponded to the amount of blood wasted by the worms over about that period. In addition the spleen and marrow contained much pigment [so that, taking also into account the nourishment actually used by the worms, the blood destruction was probably considerably greater] though the liver did not show an iron-containing pigment except in a dog which had distemper and had also been treated with phenylhydrazine. The convoluted tubes of the kidneys had their epithelium greatly degenerated and desquamating. It is noted that this loss of blood is not necessarily a measure of what occurs in chronic infections. On keeping worms from this dog in Ringer's solution at 37° C. for about 2 days the fluid did not invariably haemolyse.

Extracts of dried hookworms were injected into mice (as much as represented 300 worms per mouse) without harming them; but when live adult but not ovipositing worms were injected it was quite otherwise. The worms were washed for 5 minutes in 1 in 500 chinosol solution, then passed into a 1 in 20,000 solution and injected under the skin of mice. There some lived for as long as 12 days, the limit tested, and were very lively even then, though there was no egg production. They produced considerable haemorrhages, estimated as being as much as 0.2 cc., and wandered into the peritoneal cavity and even entered the gut; with this, haemoglobin fell greatly, to even as low as 7 per cent., and the spleen was apt to be much enlarged. The experiments are considered undecisive as to the factor producing hookworm anaemia.

C. L.

- i. DOUBROW (S.) & ROUSSET (J.). Sur un procédé de technique histologique concernant la coupe en série des petits nématodes. [**Technique of Serial Sectioning of Small Nematodes.**—*Bull. d'Histologie.* 1929. Vol. 6. p. 416. [Labs. of Histol. & Parasitol., Faculty of Med., Lyons.]
- ii. — & —. Etude cytologique du contenu intestinal de l'*Ankylostoma duodénale*. [**Cytological Study of Gut Contents of *A. duodénale*.**—*C.R. Soc. Biol.* 1930. Mar. 14. Vol. 103. No. 10. p. 786. [1 ref.]

i. The authors point out the difficulties in obtaining satisfactory sections of small nematodes even when embedded in celloidin and have

devised and recommend the following technique, with its appeal to the epicure and helminthologist, as giving serial sections 4μ thick even in these most difficult subjects.

The worms are fixed for 4 to 12 hours in a modified Schaudinn's solution, namely a saturated solution of perchloride of mercury in 80 per cent. alcohol with the addition of 5 per cent. glacial acetic acid. They are transferred to 80 per cent. alcohol tinted with a few drops of iodine to the colour of a good madeira wine where they are left for a week on the average, but for longer without damage if desired. After several baths in 90 per cent. alcohol (absolute alcohol is not indispensable) they are left for 24 hours in butyl alcohol, and again for 24 hours in an incubator at 56°C . in butyl alcohol saturated with paraffin. Next follow one or, better, two baths in pure paraffin each lasting 24 hours, after which the usual procedure allows of serial sections being fastened on slides and stained.

ii. Using this technique the authors found that in the proximal parts of the alimentary canal of hookworms there was found an eosinophil residue with some few red corpuscles still identifiable, white corpuscles were recognized by their nuclei, but nothing was found which could be identified as epithelial cells of the small intestine. Further caudally, the intestinal contents lessen. In the anterior part there were collections of yellow pigment which did not show the reaction of Perls [Prussian blue reaction].

C. L.

FÜLLEBORN (F.). Was ist Ground-itch? Ein kritisches Sammelreferat. [What is Ground Itch?—*Arch. f. Schiffs- u. Trop.-Hyg.* 1930. Mar. Vol. 34. No. 3. pp. 133–158. With 5 text figs. [3 pages of refs.] [Inst. for Ship & Trop. Diseases, Hamburg.]

The literature of ground itch is reviewed, the condition being described as reddening followed by vesiculation and later by pustulation of the skin commonly interpreted as associated with penetration by hookworm larvae. In geographical distribution it is limited to Assam, Bengal, the mulberry plantations of China, the islands and shores of the Caribbean Sea including the southern United States, and perhaps the Amazon region, with no report of its presence from many hookworm countries, including Egypt, or from many hookworm infected mines, nor does Fülleborn believe that there is satisfactory evidence to connect it with intense infection. He points out that a vesicular eruption was not obtained by Looss in his classical experiments, and that the theory of their cause by a secondary infection due to scratching of the irritable point of larval entry is untenable since scratching occurs in all lands, but ground itch in certain of them only; while this last objection is equally against its being an anaphylactic effect. Dermatomycosis, cercarial dermatitis, and the bites of ticks and mites all may produce a vesicular dermatitis, which however especially occurs on plantations in which the pickers stand long on muddy ground, that is to say in conditions in which the epithelium of the feet is sodden and lifted, just as that of the hands of washerwomen. It is then looked upon as an occupational disease and it is suggested that the ambiguous terms ground itch and mazamorra should be replaced by the hindustani term originally used by ELLIOTT in 1900, namely panighao [which means "water sore" (as indeed ELLIOTT alternatively named the condition in the title of the paper in which he originally described the condition in 1900), and which seems

to differ too little in ambiguity from ground itch to necessitate or justify any change 30 years later, particularly into a language so few readers understand.]

C. L.

KITAMURA (K.). **Experimental Studies on Dermatitis caused by Hookworm Larvae.**—*Japanese Jl. Dermat. & Urol.* 1930. Apr. Vol. 30. No. 4. pp. 279-317. With 12 text figs. [114 refs.] [In Japanese. English summary pp. 37-39.] [Dermat. Clinic, Imperial Univ., Tokyo.]

The positions in which a histological examination found larvae are enumerated in the English summary. Regarding the clinical condition caused on the skin, it began in dogs with erythema, and was followed by swelling, bullae, pustules, erosion and ulcer with spontaneous recovery [indeed typical ground itch]; at the same time, even before there was clinical erythema, sections showed congested blood vessels with eosinophil cells and, subsequently, exudation of leucocytes including eosinophils into the surrounding parts—perivascular, perifollicular, intrafollicular and into the subcutaneous tissue, and masses of cast sheaths on the surface at times.

C. L.

FÜLLEBORN (F.). Können Larven von *Ancylostoma duodenale* oder *Necator americanus* "Creeping Eruption" verursachen? [**Can Larvae of *A. duodenale* or *N. americanus* cause Creeping Eruption?**—*Arch. f. Schiffs- u. Trop.-Hyg.* 1930. Apr. Vol. 34. No. 4. pp. 220-223. [12 refs.] [Inst. for Ship & Trop. Diseases, Hamburg.]

Fülleborn concludes that larvae of *A. duodenale* and *N. americanus* do not cause creeping eruption in man, but holds that the condition which LOOSS described on his own person was clearly not creeping eruption in the sense of RILLE, caused by a larva of some kind, but was a wandering wheal, such as the supersensitization of skin caused by strongyloides larvae.

C. L.

ELLENBOGEN (Victor). Experimenteller Beitrag zur Frage der durch die Larven von *Ankylostoma caninum* beim Menschen verursachten Hauterscheinungen. [**Skin Changes produced in Man by Larvae of *A. caninum*.**—*Klin. Woch.* 1930. Aug. 23. Vol. 9. No. 34. pp. 1583-1585. With 1 text fig. [9 refs.] [Inst. for Ship & Trop. Diseases, Hamburg.]

Infective larvae in Ellenbogen's experiments did not penetrate the undamaged skin of the persons on whom the experiments were tried. In seven instances in which they penetrated damaged skin a slightly itching nodule followed in one. No creeping eruption appeared.

C. L.

MARQUES (Arnaldo). Da symptomatologia da ancylostomiasse. (Estudo clinico de dois signaes buccaes pouco conhecidos.) [Symptoms of Ankylostomiasis.]—*Brasil-Medico*. 1930. Feb. 15. Vol. 44. No. 7. pp. 190-192. [10 refs.]

Marques believes that the precision of microscopic diagnosis has diverted attention from clinical examination. He holds that there are two signs diagnostic of hookworm infection, "sheep's tongue" and "rodent's teeth." The latter have the colour of those of the agouti and their wearing down, which is most obvious in the lower incisors, is attributed partly to grinding of the teeth in restless sleep and partly to earth eating. The "sheep's tongue" is a condition of patchy slate-coloured pigmentation not actually limited to the tongue but found on the gums, the mucosa of the cheeks, and on the skin. It is believed that it must be correlated with the accompanying weakness and low blood pressure as being an Addisonian complex, which calls for investigation of the state of the suprarenals in hookworm infection. It is noted as being found only in chronic cases, principally those with a verminous cachexia. [In 1902 DELAMERE wrote to MANSON (*Jl. Trop. Med.*, Vol. 5, p. 183) describing spots looking "exactly as if the patient had just wiped a penful of Stephens' blue-black ink on his tongue." He found that under treatment with thymol, iron and quinine the small marks disappeared in from 10 to 20 days, the larger ones taking 6 weeks or more. DUPREY (l.c. p. 267) had frequently noted these markings but only in immigrant Indians who have the habit of eating *pan*. SANDWICH (*Ibid.* 1904, Vol. 7, p. 247) reported examining in Cairo 100 patients with ova found in their stools and 100 without, found 11 cases of pigmentation in the first and 7 in the second, and held that the pigment marks were of no value for diagnostic purposes. The matter has since been almost completely dropped. The precision of microscopic diagnosis to which Marques refers gives him a means of settling the matter.]

C. L.

KEUKENSCHRIJVER (N. C. Romer). Afdrijven van mijnwormen met behulp van de duodenaalsonde. [Expulsion of Hookworms by Means of the Duodenal Tube.]—*Geneesk. Tijdschr. v. Nederl.-Indië*. 1930. Oct. 1. Vol. 70. No. 10. pp. 1000-1001.

Since the duodenal sound has been used for the treatment of tape-worm infection, it was here tried for hookworms, 1.2 cc. or 1.5 cc. of oil of chenopodium [ascaridole content unstated] being given, followed by Epsom salts, to 200 Javanese. Later 1.5 cc. of carbon tetrachloride was administered and the number of worms recovered by each treatment noted. In many cases of anaemia no worms at all were recovered [the grounds on which they were selected for treatment are unstated] but 20 are listed. In three given 1.2 cc. of oil of chenopodium the percentage of the total worm recovery by that treatment varied from 40 to 100, and with a dose of 1.5 cc. from 0 to 100. The microscope is not mentioned as having been used in the attempt to establish disinfestation, nor is the efficacy of the drug when given by sound compared with an administration by mouth in otherwise like conditions.

C. L.

MIYAGAWA (Yoneji) & OKADA (Ryoichi). **Biological Significance of the Lung Journey of Ancylostoma Larvae in the Normal Host. First Report.**—*Japan Med. World.* 1930. Mar. 15. Vol. 10. No. 3. pp. 43-55. [Government Inst. for Infectious Diseases, Imperial Univ., Tokyo.]

The hookworms used were *A. caninum*. First there is confirmation of observations that the amount of infection induced when infective larvae are given by the oral route to the normal host lessens with the age of the host. Next pups were infected through the skin and from them larvae were collected (1) from the lung, (2) from the trachea, and (3) from the intestine, and were fed to other pups. The percentages of young worms recovered from these second animals were respectively 75, 90.3 and 93. But if the first animals were abnormal hosts—rabbits or guineapigs—and larvae were taken from the trachea and fed to pups, the percentage of worms found in the pups was 51 to 58.5. [Although there is some difficulty in understanding the text, comparison with tables and cross headings leave no reasonable doubt that the above accurately describes the results obtained.] During the passage through the lung of normal hosts the hookworms undergo changes which progressively fit them for growth in the intestine; during the passage through abnormal hosts this is far less so. Moreover, if migrating larvae taken from the lung of an abnormal host (rabbit) were fed to another abnormal host (guineapig), most were then found in the lungs of the latter but no development had taken place. If however the first animal were a normal host (pup), then migrating larvae taken from its lung or trachea and fed to an abnormal host did develop and migrate in the latter to an extent depending on circumstances. Of larvae taken from the pup's trachea 24 hours after infection and fed to guineapigs about half reached their lungs, of those taken from the small intestine 24 hours after infection few reached the lungs, while of those taken from the small intestine 48 hours after infection none reached the lungs; they remained largely or wholly in the intestine. Moreover these worms developed, in guineapigs to the 4th ecdysis, in rabbits almost to maturity. So that the biological change which takes place in the lungs "is indispensable for the completion of their future development."

C. L.

McCoy (O. R.). **The Influence of Temperature, Hydrogen-Ion Concentration, and Oxygen Tension on the Development of the Eggs and Larvae of the Dog Hookworm, *Ancylostoma caninum*.**—*Amer. Jl. Hyg.* 1930. Mar. Vol. 11. No. 2. pp. 413-448. With 4 text figs. [15 refs.] [School of Hyg. & Public Health, Johns Hopkins Univ., Baltimore.]

Dr. McCoy has cleared up by letter certain points in one of his techniques which had not been entirely understood, and full advantage of his courtesy has been taken in this abstract. The temperature, hydrogen ion concentration and oxygen tension were studied.

Temperature.—At the bottom of a 250 cc. Erlenmeyer flask is a layer of 20 cc. of ordinary solidified bacteriological agar. To this is added 1 cc. of a suspension of bacteria and, after 24 hours incubation of the flask, 1 cc. of a suspension of hookworm eggs [this *Bulletin*, Vol. 27, p. 426]. This amount of liquid forms a layer about 1 mm. thick on the surface of the agar, and it becomes rather viscous from

bacterial growth during incubation. Thirty such cultures were used in each experiment and about 10,000 eggs introduced into each flask; the humidity of the air was at least 85. At certain intervals two flasks were removed, 30 to 80 cc. of warm water added to each and the flasks sufficiently shaken to wash the larvae from the agar into the suspension. Two $\frac{1}{2}$ cc. samples of this suspension were withdrawn and counted. The results were as follows:—

“Thirty-seven degrees centigrade and 15° C. were the highest and lowest temperatures at which the larvae reached the infective stage in agar cultures with bacteria for food. Eggs hatched at 40° and 12° C., but the larvae did not complete their development. At 42° C. the eggs started to develop but did not hatch. The larvae developed most rapidly at 37° C., reaching the infective stage in 48 hours. At 30° C. they matured in 50 to 60 hours, while at 23° C. 4 to 5 days were required. Judging by the per cent. of the larvae which became infective and the final size that they attained, 23° and 30° were the most favourable temperatures tested. Under the conditions of the experiment, the latter may be considered as the optimum. The per cent. of the larvae which matured and their final size was much less at 37°, 17°, and 15° C. than at 23° and 30° C.”

Hydrogen ion concentration.—For hatching of eggs these were incubated at 23° C. for 48 hours in 20 cc. of buffer solution. For growth of larvae 20 cc. of a suspension of *Bact. coli* or *B. lactis aerogenes* (to supply food for the larvae) in buffer solutions of the same size were incubated with sterile eggs. Considerable difficulty was found in obtaining buffer solutions which would not kill bacteria or larvae; those used were potassium acid phthalate for acid, a mixture of mono-basic and di-basic sodium phosphate for neutral, and a mixture of sodium bicarbonate and acid sodium carbonate for neutral. The pH range suitable for development was about the same for eggs and larvae.

“Acidities as great as pH 4.6 are not in themselves capable of inhibiting the growth of hookworm larvae. In fact a few larvae developed at acidities down to pH 4.0. The failure of larvae to develop in unmodified feces which showed acid reactions within this range must, therefore, be attributed to some other agent or condition, possibly associated with acidity. Alkalinities up to pH 10.0, also, did not inhibit the development of the larvae. Above this pH, the few larvae which hatched died without growing. The pH range in which larvae became infective is thus 4.0 to 10.0. The percentage of larvae which develop, however, is smaller at the extremes of this range. The size of the infective larvae reared in the more acid cultures was smaller than normal, but in the alkaline cultures the size attained by the larvae was not affected. There were no significant differences in the suitability of the cultures which ranged from pH 6.0 to 9.4.”

Oxygen requirements.—Eggs in boiled water (boiled to drive off oxygen) in vials set in vessels containing pyrogalllic acid and caustic soda underwent no development. Oxygen is then necessary for this. Regarding sterile eggs in 1 in 2,500 formalin solution, which killed larvae as soon as they hatched, each on the average used 0.000028 cc. of oxygen up to the period of hatching. The solution at 23° C. contained 6 cc. of oxygen per litre and 250 cc. of it was used in an Erlenmeyer flask of that capacity. It was found that with as little oxygen as 0.4 cc. per litre all eggs hatched provided there were relatively few of them, but when the numbers were so increased that, as above estimated, there was insufficient oxygen for more than half to develop as far as hatching, then only 11 to 24 per cent. did actually hatch in these experiments. As regards excessive oxygen tension, obtained by pressure, more than 15 cc. per litre proved harmful and 30 cc. per

litre inhibited development altogether. Infective larvae lived as long as 4 but not as long as 12 days in the anaerobic tubes mentioned. When kept in sterile conditions (1 in 2,500 formalin solution) to ensure that bacteria should not be present and consume oxygen, the consumption of this gas by the larvae increased with the temperature, that is with larval activity, from 0.0000169 cc. in 24 hours at 17° C. to 0.00001958 at 42° C. or about 9 per cent. for each degree centigrade.

C. L.

OISO (Tomoaki). Experimentelle Untersuchungen ueber Infektion mit *Ankylostoma braziliense*. [Experimental Infection with *Ancylostoma braziliense*.]—*Taiwan Igakkai Zasshi* (*Jl. Med. Assoc. Formosa*). 1930. June. No. 303. [In Japanese. German summary pp. 28-32.]

In seven persons infection with *A. braziliense* was deliberately induced—in 4 cases by mouth and in 3 by the skin—150 to 600 infective larvae being used in each case. It is stated that thymol, naphthalin [? betanaphthol], "nematol," and carbon tetrachloride proved good anthelmintics, so presumably different anthelmintics were used in different cases. The worms recovered by them had varying relations to the number of larvae concerned. In skin infections they were 4.8, 6.8, and 9.16, and in oral infections 14.6, 21, 43.33 and 74 per cent.; the actual numbers varied between 24 and 142. Evidence for disinfestation is unnoted in the summary. In all cases a definite illness with anaemia and gastro-intestinal disturbances was established as the result of infection. The blood picture is described in detail.

C. L.

VILLELA (Gilberto G.) & TEIXEIRA (J. de Castro). [In Portuguese & English.] Proteínas do plasma na ankylostomose. **Plasma Proteins in Hookworm Disease.**—*Mem. Inst. Oswaldo Cruz*. 1930. Vol. 23. No. 1. In Portuguese pp. 41-49. [11 refs.] In English pp. 50-58. [11 refs.]

Twenty cases of severe ankylostomiasis were investigated. It was concluded that the total proteins in plasma were lessened, this being due to decrease in albumin, globulin being slightly and fibrinogen generally increased, and non-protein nitrogen being within normal limits. This leads the writers to class helminthic anaemia as a "nephrosis."

C. L.

STUMBERG (John E.). **Precipitin and Complement-Fixation Tests on Dog Sera with Antigen from the Dog Hookworm, *Ancylostoma caninum*.**—*Amer. Jl. Hyg.* 1930. Nov. Vol. 12. No. 3. pp. 657-668. With 4 graphs in text. [10 refs.] [School of Hyg. & Public Health, Johns Hopkins Univ., Baltimore.]

"Dried filariform larvae and adults of the dog hookworm, *Ancylostoma caninum*, extracted with acid and alkaline saline solutions, were found to be highly antigenic when injected intravenously into rabbits; alkaline saline extracts were preferable to acid. . . . Dogs parenterally injected with larval and adult antigens failed to show any precipitins in the sera or any complement fixation in excess of the non-specific level. Dogs experimentally infested with hookworms, either by a single infection or after several infections, failed to show anti-bodies in their sera up to seven weeks after infestation."

C. L.

SCOTT (J. Allen). **The Biology of Hookworms in their Hosts.**—*Quarterly Rev. Biol.* 1930. Mar. Vol. 5. No. 1. pp. 79-97. [42 refs.] [School of Hyg. & Public Health, Johns Hopkins Univ., Baltimore.]

A critical survey of matter which has already been abstracted in this *Bulletin*, and the putting of a number of questions which still require elucidation.

C. L.

CAMPOS (F. M.) & CAMPOS (P. Souza). Metabolismo basal na ancylostomose.—**Basal Metabolism in Uncinariasis.**—*Rev. Biol. e Hyg.* S. Paulo. 1929. Vol. 2. No. 1. pp. 69-72. English summary. [8 refs.] [Physiol. Dept., Faculty of Med., S. Paulo.]

"1. The basal metabolism of 24 hookworm infected individuals, determined in accordance to the Benedict-Roth method, oscillated between -31 to +57 per cent.

"2. The cases of increase were observed most frequently in individuals, suspected of a recent infection."

C. L.

ABDULLA (M.). Nervous Symptoms apparently due to a Heavy Ascaris Infection.—*Indian Med. Gaz.* 1930. Apr. Vol. 65. No. 4. pp. 207-208.

ARCHER (G. T. L.). Note on a Case of Double Taenia Infestation (*T. solium* and *T. saginata*).—*Jl. Roy. Army Med. Corps.* 1930. Sept. Vol. 55. No. 3. pp. 216-217. With 2 text figs.

BARNEOUD. La bilharziose vésicale au Maroc.—*Marseille Méd.* 1930. Apr. 5. Vol. 67. No. 10. pp. 453-481. [1 ref.]

CAWSTON (Frederick G.). A Consideration of the Cause and Cure of Bilharzia Disease.—Reprinted from *Urol. & Cutaneous Rev.* 1929. Dec. Vol. 33. No. 12. pp. 817-820. With 4 text figs.

CAWSTON (F. G.). Les schistosomes rares de l'Afrique du Sud.—*Ann. Parasit. Humaine et Comparée.* 1930. July 1. Vol. 8. No. 3/4. pp. 259-262. With 2 text figs. [7 refs.] [Britannia Buildings, Durban, Natal.]

CHESNEAU (P.) & TRAN-VAN-MANH. Sur un cas d'hémiplégie ascaridienne.—*Bull. Soc. Méd.-Chirurg. Indochine.* 1930. Apr. Vol. 8. No. 4. pp. 294-296.

DASSEN (Rodolfo) & REY (J. C.). Hidatidosis raquídea.—*Semana Méd.* 1930. Apr. 10. Vol. 37. No. 15 (1891). pp. 921-926. With 2 text figs. [1 ref.]

DELANOE (P.). Quatrième cas algérien de distomatose humaine à *Fasciola hepatica* L.—*Bull. Soc. Path. Exot.* 1929. Oct. 9. Vol. 22. No. 8. pp. 673-674. [1 ref.] [District Hosp., Mazagan, Morocco.]

DIXEY (M. B. D.). A Case of Sudden Death due to Occlusion of the Larynx by *Ascaris lumbricoides*.—*West African Med. Jl.* 1929. July. Vol. 3. No. 1. p. 5. [1 ref.]

DU TOIT (J. A.). Rare Sites for the Development of Hydatid Disease in Man.—*Jl. Med. Assoc. South Africa.* 1929. Sept. 14. Vol. 3. No. 17. p. 492. With 1 text fig.

ESSEX (Hiram E.) & BOLLMAN (Jesse L.). Parasitic Cirrhosis of the Liver in a Cat infected with *Opisthorchis pseudofelineus* and *Metorchis complexus*.—*Amer. Jl. Trop. Med.* 1930. Jan. Vol. 10. No. 1. pp. 65-70. With 4 figs. [4 refs.]

FALCÃO (Edgard de Cerqueira). Filária sub-conjunctival. (A proposito de uma nota do Dr. Edilberto Campos).—*Brasil-Médico.* 1930. Jan. 25. Vol. 44. No. 4. pp. 104-105.

GIRGES (Rameses). The Clinical Aspect of Schistosomiasis Haematobium.—*Jl. Trop. Med. & Hyg.* 1930. June 2. Vol. 33. No. 11. pp. 149-159. With 4 graphs & 3 charts.

- HELMY (Mahmoud Mustafa). An Easy and Accurate Method of Microscopical Diagnosis of Intestinal Bilharziasis.—*Jl. Egyptian Med. Assoc.* 1930. Feb. Vol. 13. No. 2. p. 65.
- HINRICHSEN (H. M.). Verkalkte Zystizerken in der Muskulatur.—*Fortschr. Geb. Röntgenstrahlen.* 1929. Vol. 39. No. 4. pp. 666-669. With 5 figs.
- HOEPPLI (R. J. C.). Parasitic Nematodes and the Lesions they produce.—*Nat. Med. Jl. China.* 1930. Feb. Vol. 16. No. 1. pp. 103-110. [Union Med. College, Peiping.]
- KHOURI (J.). Note sur la bilharziose en Egypte.—*Rev. Prat. Malad. des Pays Chauds.* 1930. Jan. Vol. 10. No. 1. pp. 33-34. [1 ref.]
- KOTAKE (Masakichi). Anchylostoma Larva in Mammary Gland.—*Osaka Igakka Zasshi.* (*Jl. Osaka Med. Soc.*). 1929. Sept. Vol. 28. No. 9. [Summarized in *Japan Med. World.* 1930. Oct. 15. Vol. 10. No. 4. p. 75.]
- NAUCK (Ernst G.). Gehirnzystizerkosis. Bericht ueber 3 Fälle aus Costa Rica.—*Arch. f. Schiffs- u. Trop.-Hyg.* 1930. Mar. Vol. 34. No. 3. pp. 158-161. With 1 text fig. [San Juan de Dios Hosp., San José, Costa Rica.]
- NEGISHI (Kenzo). Ueber die Eier von *Dicrocoelium lanceatum*, welche bei der menschlichen Stuhluntersuchung gefunden wurden.—*Okayama-Igakkaizasshi* (*Zent. d. Okayama Med. Gesellsch.*).—1929. Aug. Vol. 41. No. 8. pp. 1797-1801. With 1 fig. & 1 plate. [14 refs.] [In Japanese. German summary p. 1802.] [Bact. Inst., Med. Univ., Okayama.]
- NOTO-SOEDIRO (R.). *Paragonimus westermani* (Kerbert) bij een kat.—*Nederl.-Indische Bladen v. Diergeneesk.* 1930. June. Vol. 42. No. 3. pp. 278-280. English summary (8 lines) p. 280.
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RABIES :

A REVIEW OF RECENT ARTICLES. XIV.*

i. *Virus.*

It will be remembered that at the International Conference on Rabies (1927) it was resolved that researches should be conducted on the plurality of street virus. This work has been taken up by REMLINGER and BAILLY¹ and a report is now submitted. The authors determined to limit their enquiry to strains (1) taken from individuals who had died of rabies in spite of treatment and whose wounds were of a trivial type, and (2) to viruses obtained from biting animals exhibiting abnormal symptoms but proved to be rabid by sub-inoculation. They investigated in the first instance a virus isolated by TÉODORASCU from two persons who had died of rabies in spite of intensive pasteurian treatment. This virus was said to have shown a total absence of cross immunity with the fixed virus employed at the institute (Chisinau). As the result of a series of protective experiments the authors found that the virus of Tangier protected against that of Chisinau, and conversely. The Chisinau strain, in this sense then, does not differ from the classic strain. A further series of experiments was carried out in which mixtures of vaccine and antisera were injected. Virus and antisera from fixed virus, from the Morocco strain and from the Rumanian strain, were set up each against the others, and injected into animals. It appeared that the antisera of fixed virus and of street virus of Morocco protected against all three viruses, whereas the serum from the Rumanian virus possessed no viricidal properties whatsoever. Although the Rumanian strain might be called a bad antigen, yet the sera of the other two viruses were antagonistic to it. That is, in the authors' opinion, the important practical point. They hold to their previously expressed opinion that polyvalent and auto vaccines are a useless complication of antirabic treatment.

In relation to the *oulou-fato* of West Africa DUPUY² describes a case of human rabies in Haute-Volta on the frontier of the Gold Coast, whilst SICÉ and BOISSEAU³ report on the viruses obtained from two cases of canine rabies from French Equatorial Africa. DABBADIE⁴ presents further evidence in favour of the view that *oulou-fato* is identical with rabies. The virus from a dog which exhibited symptoms of paralysis was passaged to the third generation through laboratory animals. The phenomena observed were those of ordinary rabies. The virus was not lost, nor did it become attenuated in virulence.

* For the thirteenth of this series see Vol. 27, pp. 742-755.

¹ REMLINGER (P.) & BAILLY (J.). Unicité ou pluralité du virus rabique.—*Ann. Inst. Pasteur.* 1930. Sept. Vol. 45. No. 3. pp. 376-385. [3 refs.] [Pasteur Inst., Tangiers.]

² DUPUY (H.). Un cas de rage humaine en Haute-Volta.—*Bull. Soc. Path. Exot.* 1930. July 9. Vol. 23. No. 7. pp. 702-703.

³ SICÉ (A.) & BOISSEAU (R.). Contribution à l'étude de la rage canine (virus des rues) en Afrique Equatoriale Française.—*Bull. Soc. Path. Exot.* 1930. July 9. Vol. 23. No. 7. pp. 703-709. [9 refs.] [Pasteur Inst., Brazzaville.]

⁴ DABBADIE (P.). Transmission expérimentale de la rage canine en Haute-Volta à partir du virus d'un chien "fou" de race indigène.—*Bull. Soc. Path. Exot.* 1930. Oct. 8. Vol. 23. No. 8. pp. 857-859.

A case of human rabies occurring in the Gold Coast, is reported by HAWE and RUSSELL.⁵ Negri bodies were found in the brain, and subpassage into six rabbits confirmed the diagnosis. In an editorial note attention is drawn to a previous case in 1925, and to a subsequent case in the Northern Territories of the Gold Coast. In both instances the diagnosis was confirmed by laboratory methods.

The degree of filtrability of the virus has been exhaustively re-examined by GLUSMAN, SOLOWJOWA, and PREDTETSCHENSKAJA.⁶ They have found that the virus can pass through such wide pored bougies as Chamberland L₂ and L₃, but that the number of positive results is comparatively small. A number of precautions have to be observed in preparing the emulsion for filtration, for the details of which the reader is referred to the original communication. Eight emulsions were tested, the filtrates of five of these (L₁, L₂ and L₃) contained virus, and of the filtrates three (L₂, L₃ and L₄) did not produce typical rabies on inoculation. It appeared, however, that in addition to the ordinary symptomatic syndrome of rabies in the rabbit, an atypical form with absence of paralyses and lengthening of the incubation period occurred. The diagnosis of rabies in such cases could only be determined by the recovery of typical rabies after from 2 to 3 subpassages. In certain other cases the filtrate caused an ascending paralysis of the Landry type, which gave a negative result on subsequent subpassage through rabbits. Similar paralyses were observed after the administration of fixed virus which had been preserved over long periods in glycerine. The authors conclude that the virus of rabies is not a true filter passer; and that in certain stages it is a visible microbe. Paralyses of the Landry type may be occasioned not only by the filtrate but also by unfiltered material.

In a further paper GLUSMAN, SADOWSKY and SOLOWJOWA⁷ describe experiments in which an emulsion of rabies virus was mixed with virus of foot and mouth disease before filtration. The viruses behaved differently. Whilst that of the latter disease came through with its usual characteristics that of rabies was altered in the sense described in the previous paper. In agreement with the results arrived at in the previous paper it would appear that the virus of rabies consists mainly of unfiltrable forms.

STOEL⁸ confirms LEVADITI'S observation that the virus of rabies is maintained and probably multiplies when placed *in vitro* in contact with cellular elements. He finds that the virus develops in contact with embryonic cerebrum in rabbit plasma, and he has succeeded in realising five virulent passages. It cannot be cultivated with other tissues such as Rous sarcoma, or in chicken plasma.

⁵ HAWE (J. A.) & RUSSELL (H.). A Case of Human Rabies.—*West African Med. Jl.* Lagos. 1930. Apr. Vol. 3. No. 4. pp. 77-78. [Med. Research Inst., Accra.]

⁶ GLUSMAN (M. P.), SOLOWJOWA (J. W.) & PREDTETSCHENSKAJA (L. A.). Gehört der Erreger der Tollwut zu den Ultra-Virus? I. Mitteilung.—*Zent. f. Bakt. I. Abt. Orig.* 1930. June 3. Vol. 117. No. 1/3. pp. 128-139. [27 refs.] [Bact. Inst., Kharkov.]

⁷ GLUSMAN (M. P.), SADOWSKY (I. J.) & SOLOWJOWA (J. W.). Vergleichende Untersuchungen ueber die Filtrierbarkeit des Lyssa- und des Maul- und Klauenseuche-Virus.—*Zent. f. Bakt. I. Abt. Orig.* 1930. July 28. Vol. 117. No. 7/8. pp. 450-459. [6 refs.]

⁸ STOEL (G.). Symbiose du virus de la rage avec les cultures cellulaires.—*C.R. Soc. Biol.* 1930. July 4. Vol. 104. No. 23. pp. 851-852. [2 refs.] [Pasteur Inst., Paris].

ii. *Clinical.*

DALEAS and HASLÉ⁹ report a case of accouchement during the course of rabies. The mother exhibited all the classic symptoms of the disease, but the accouchement was normal. The mother died eight hours later. The infant was detained for three months in the maternity hospital. She was removed by her relatives, and three days later died of acute gastro-enteritis.

PALAWANDOW and SEREBRJENAJA^{10, 11} have succeeded in proving that the saliva taken from two patients on the day previous to death contained the virus. For a successful result they found that intramuscular injection of large quantities (not less than 2 cc.) of saliva was necessary, and that the inoculated animals should be kept under observation for not less than six months. Negri bodies were not found in the brains of the inoculated animals in the earlier subpassages, but in the later they were invariably present. They conclude that in the exceptional case of persons *bitten* by rabid human beings treatment should be administered.

BABLET, JOYEUX, and LECLERC¹² summarize the results of their experience of rabies in Tonking. From statistics relating to 58 cases of rabies in human beings, the incubation periods were as follows: one less than 14 days; 8 between 14 and 19 days; 23 between 20 and 25 days; 13 between 26 and 30 days; 11 between 31 and 40 days; and two more than 40 days. Thus 77 per cent. of the incubations were less than 31 days. "Since European statistics fix about 25 per cent. as the corresponding proportion, it would appear that Tonking rabies causes *rage précoce* three times more frequently than do European strains." This is partly attributed to a special sensitiveness of the Annamite race to the virus. The street virus of Tonking behaves similarly to that of Cochin China. The authors emphasize the importance of the stray dog in the dissemination of rabies, and plead for its methodical destruction.

iii. *Pathology.*

The pathology of a case of encephalomyelitis following antirabic treatment is fully described by BASSOE and GRINKER.¹³ The appearances were those of perivascular infiltrations with demyelination and axis cylinder destruction. A typical toxic reaction was observed in the ganglion cells, the vascular endothelium and the oligodendroglia. Mucocytes were found, and free mucin in places had escaped from the

⁹ DALEAS & HASLÉ. Accouchement d'un enfant au cours d'une rage.—*Bull. Soc. Méd.-Chirurg. Indochine*. 1930. Mar. Vol. 8. No. 3. pp. 258-259.

¹⁰ PALAWANDOW (Haidar) & SEREBRJENAJA (A. I.). Ueber die Anwesenheit des Tollwutvirus im menschlichen Speichel.—*Ztschr. f. Immunitätsf. u. Experim. Therap.* 1930. Vol. 66. No. 5/6. pp. 519-529. [17 refs.] [Bact. Inst., Odessa.]

¹¹ PALAWANDOW (Haidar) & SEREBRENNAJA (A. I.). Zur Frage der Virulenz des Speichels von an Tollwut erkrankten Menschen.—*Ztschr. f. Immunitätsf. u. Experim. Therap.* 1930. Vol. 68. No. 3/4. pp. 236-242. [8 refs.] [State Bact. Inst., Odessa.]

¹² BABLET (J.), JOYEUX (B.) & LECLERC. La prophylaxie de la rage au Tonkin.—*Bull. Soc. Méd.-Chirurg. Indochine*. 1930. July. Vol. 8. No. 7. pp. 687-715. [6 refs.]

¹³ BASSOE (Peter) & GRINKER (Roy R.). Human Rabies and Rabies Vaccine Encephalomyelitis. A Clinicopathologic Study.—*Arch. Neurol. & Psychiatry*. 1930. June. Vol. 23. No. 6. pp. 1138-1160. With 16 text figs. [23 refs.] [Med. College & Med. Dept., Univ., Chicago.]

mucin-containing cells. The appearances in a second case in which, after an incubation of about a year, rabies "was stimulated into activity by trauma to the bitten hand two weeks before death," are also described. In the brain Negri bodies were observed. The differences between the pathological conditions observed in the two cases are discussed. The authors state that "the evidences of inflammation, the identity of rabies vaccine, cowpox vaccine, variola and measles, nervous lesions, and the perivascular softenings in subacute rabies suggest that the vaccinal lesions represent an attenuated rabies virus disease transmitted by the vaccine."

NICOLAU, VIALA and KOPCIOWSKA¹⁴ have failed to find any evidence of the presence of fixed virus in rabbits which have received pasteurian treatment. Submitting emulsions of nervous material to cataphoresis had no effect. Certain histological changes were observed in the brain, medulla, and spinal ganglia. These will be described in a later communication.

Although there can be no doubt that the virus of rabies is transmitted in general from the bite to the central nervous system by the nerves, the fact that it has been proved to be present in the blood of various organs suggests that other paths of transmission are possible. In order to elucidate this question SCHWEINBURG and WINDHOLZ¹⁵ have made further studies. They consider in the first place that the existence of alternative routes can only be tested by interrupting the nerve path from the seat of the bite to the central nervous system. Following the method of v. GIELBERGS, they attain union between the skin of the back of one rabbit, and a flap from another rabbit. Within six days anastomoses develop, and union is complete. This is what is meant by *parabiosis*. From observations on eighteen such couples of rats they found that in every case after a test dose of rabies had been administered the infected rat died, and the presence of rabies in its brain was proved. None of the parabionts contracted the disease.

From the summary in French of YOVELEV'S¹⁶ paper on infection through the blood stream, it appears, that all animals inoculated intravenously with massive doses of fixed virus have resisted infection. This resistance is ascribed to the existence of the hematoencephalic barrier. The destruction of this barrier by artificial means (pumping) leads to infection. Simple extraction of the cerebro-spinal fluid is in most cases insufficient.

ZUWERKALOW and GOLDENBERG¹⁷ find that a number of chemical changes occur in the blood as a result of rabies in experimental animals. In the first days of the disease the cholesterin content is

¹⁴ NICOLAU (S.), VIALA (J.) & KOPCIOWSKA (L.). Peut-on mettre en évidence le virus rabique fixe dans le système nerveux des animaux vaccinés à l'aide de la méthode pasteurienne?—*C.R. Soc. Biol.* 1930. Sept. 20. Vol. 104. No. 26. pp. 1134-1136. [2 refs.] [Pasteur Inst., Paris.]

¹⁵ SCHWEINBURG (Fritz) & WINDHOLZ (Franz). Ueber den Ausbreitungsweg des Wuterregers von der Eintrittspforte aus. (Untersuchungen an parabiosierten Ratten.)—*Virchows Arch. f. Path. Anat.* 1930. July 24. Vol. 278. No. 1. pp. 23-34. [14 refs.]

¹⁶ YOVELEV (B.). Sur quelques conditions d'infection rabique par la voie sanguine.—*Arch. Sci. Biol.* 1930. Vol. 30. No. 4. pp. 459-465. [15 refs.] [In Russian. French summary p. 466.]

¹⁷ ZUWERKALOW (D.) & GOLDENBERG (I.). Cholesterin und P-Lipoid bei experimenteller Tollwut.—*Biochem. Ztschr.* 1930. Oct. 10. Vol. 226. No. 4-6. pp. 278-285. With 2 text figs. [7 refs.] [1st Ukrainian Sanit. Bact. Inst., Kharkov.]

increased, not so much as a result of the specific infection, but rather from the reduction of water, which naturally occurs during the hunger period of rabies. The P-lipoids of the blood increase at the same time in a characteristic manner.

The pH of the brain of normal animals, and of those which have died of rabies, has been investigated by GUBIN and GOLDINA.¹⁸ That of the normal rabbit and guineapig is weakly alkaline (7.26 in the cerebral hemispheres). On the third day after intracerebral inoculation of fixed virus, the pH falls to 6.89 in the hemispheres, and remains at about that level till the sixth day, after which it again rises and reaches a maximum on the day of death (average 8th day). Corresponding values for other parts of the brain and cord are included in the paper.

NICOLAU and KOPCOWSKA^{19, 20} state that the virus of rabies contained in emulsions of cerebrum, the pH of which lies between 7.4 and 5.8, possesses a negative electric charge, and migrates towards the positive pole. For the determination of this charge the authors recommend the apparatus of TODD in preference to that of OLITSKY. Liquid collected at the positive pole is virulent whilst that collected from the neighbourhood of the negative pole is avirulent. They have attempted to prove the presence of the virus in the brains of rabbits which have died of "*neuro-infections autosterilisées*" by this method, but have failed.

iv. *Methods of Treatment, and Statistics.*

A first review²¹ of the statistics furnished by Pasteur Institutes, as a result of the resolution adopted at the Rabies Conference held in 1927 at Paris under the auspices of the Health Section of the League of Nations, has been published. The statistics relate to thirty-one institutes, and afford information regarding 31,656 treated cases. In the appendices to this review the schedules filled in by the authorities at each institute are printed, so that full details are available for further perusal and study. The material has been summarized and analysed by MCKENDRICK, and the usual statistical methods have been applied to the elucidation of the many problems which present themselves. The statistical material is only a fraction of that which would be available if returns had been received from all institutes. (It is to be hoped that in future years these will be greatly augmented.) The material is also insufficient for the interpretation of problems which necessitate its subdivision into a considerable number of groups. Certain points, however, appear to emerge in a definite manner. It appears that a subdivision of the statistics into those which relate to

¹⁸ GUBIN (W. M.) & GOLDINA (R. B.). Ueber die aktuelle Reaktion der Hirnsubstanz bei experimenteller Tollwut.—*Zent. f. Bakt. I. Abt. Orig.* 1930. Mar. 4. Vol. 116. No. 1. pp. 76–80. [4 refs.] [Metschnikoff Inst. for Infectious Diseases, Moscow.]

¹⁹ NICOLAU (S.) & KOPCOWSKA (L.). Virus rabique et cataphorèse.—*C.R. Soc. Biol.* 1930. Sept. 20. Vol. 104. No. 26. pp. 1142–1143. [3 refs.] [Pasteur Inst., Paris.]

²⁰ NICOLAU (S.) & KOPCOWSKA (L.). Essais de réactivation, à l'aide de la glycérine ou de la cataphorèse, du virus rabique dans le cerveau de certains lapins morts de "*neuro-infection autostérilisée*."—*C.R. Soc. Biol.* 1930. Sept. 20. Vol. 104. No. 26. pp. 1139–1142. [3 refs.] [Pasteur Inst., Paris.]

²¹ MCKENDRICK (A. G.). Analytical Review of Reports from Pasteur Institutes on the Results of Antirabic Treatment.—League of Nations. Health Organisation. L.o.N.P. III. Health. 1930. III. 2. 158 pp. Geneva.

European and non-European groups respectively is a primary necessity. There is a marked degree of correlation between race type and mortality rate, in that where the proportion of non-Europeans is high, the mortality is high, and conversely. Comparisons of the various methods of treatment are rendered possible only when the two race types are treated separately. These comparisons have been made, and as the result of various methods of statistical analysis it has not been possible, from the figures available, to find decisive evidence that any clear advantage exists in favour of any one of the various methods of treatment under consideration. In particular it has not been possible to demonstrate superiority of methods employing living vaccines, over those in which killed vaccines are used.

Within the European group the differences between the death rates of the various institutes are not greater than would be expected as the result of chance variations. A similar statement is also true with regard to the non-European group, but it is not true with regard to the whole statistics embracing the two groups. It is interesting to note that this racial distinction (viz., that the non-European who presents himself for treatment is at a higher degree of risk than the European) is eliminated, as might be expected, in the case of persons bitten by wolves. The fatality amongst persons bitten by these ferocious animals does not significantly vary whether the treatment be that of dried cords, killed phenol vaccines, or ether vaccines (not killed). It is also interesting that the same elimination appears to occur in relation to persons grouped under Categories A and B, but not to persons grouped under Category C. The mortalities for Categories A and B do not significantly vary whether the vaccines be living or dead, whilst differences between the mortalities for Category C are highly significant. This suggests that the European as compared with the non-European is at a definitely lower degree of risk not only on account of a lesser degree of severity of bite, but also with regard to the rabidness of the biting animal. For definite adjudication on these latter points, however, larger statistics are essential. "It is emphasized that the negative conclusions regarding the relative efficiencies of the various methods of treatment are only provisional and that more positive results may come to light when fuller and larger statistics are available." Statistics relating to the occurrence of paralytic accidents will be referred to in Section v below.

Attention has been drawn to statistics and animal experiments by CUNNINGHAM and MALONE (this *Bulletin*, Vol. 27, p. 742), and to experiments by GLOSTER, BEER, NAMBIAR and SASTRY (this *Bulletin*, Vol. 27, p. 259) on the relative efficacies of carbolized and etherized vaccines. It will be remembered that the results were in favour of the latter when each vaccine was administered in the dosage commonly employed with that vaccine; but that there was no significant difference when the two types of vaccine were administered in the same dosage. It appeared from the experiments of GLOSTER and his co-workers that the efficacy of treatment by large doses of carbolized virus occupied a position somewhere between treatment by small doses of carbolized vaccine, and treatment by large doses of etherized vaccine, but that from the available data this position could not be exactly defined. This lacuna is now filled up by TAYLOR and MENON.²²

²² TAYLOR (J.) & MENON (K. N.). Experiments in Dosage of Carbolized Anti-Rabic Vaccine.—*Indian Jl. Med. Res.* 1930. Oct. Vol. 18. No. 2. pp. 711-722. [2 refs.]

Three experiments were carried out in which a control group of rabbits was compared with similar groups treated by varying multiples of human doses of carbolized vaccines (SEMPLE).

The protocols are as follows :—

	Original number of animals.	Remain- ing for test.	Died of rabies.	Died other- wise.	Sur- vived.
Experiment 1 :—					
Controls ...	10	10	9	1	0
Equivalent human dose	10	10	5	0	5
5 times above dose ...	10	9	4	1	4
10 " " " ...	10	8	0	2	6
Experiment 2 :—					
Controls ...	10	10	10	0	0
5 times above dose ...	10	10	4	1	5
Ditto filtered ...	10	10	8	0	2
" " " ...	10	10	9	0	1
Experiment 3 :—					
Controls ...	10	10	10	0	0
Equivalent human dose	10	9	8	0	1
5 times above dose ...	10	10	5	0	5
Equivalent human dose etherized and car- bolized ...	10	10	10	0	0
Ditto, 5 times dose ...	10	10	3	1	6

Thus the efficacy of the treatment can be enhanced by increasing the dosage of the vaccine. Filtration greatly reduces immunizing power, and preliminary extraction with ether does not sensibly affect the efficaciousness of the vaccine. [The results of a large statistical experiment on human beings by CUNNINGHAM and MALONE will shortly appear.]

As the result of a number of experiments GALLEA²³ finds that formol (1 per cent.) completely inactivates the virus of rabies after 24 hours contact. The virus, however, retains its antigenic properties, as was shown by the following experiment. Each of eleven rabbits received three doses of 20 cc. of vaccine at intervals of two days. They were submitted to an intra-ocular test dose 12 to 15 days later, and all survived. Of an equal number of controls all succumbed.

At the Pasteur Institutes of Coonoor and Bombay the sheep is occasionally used in place of the rabbit as a source of fixed virus. IYENGAR and BEER²⁴ have for practical reasons made observations on the effect of ether on the brain of sheep. They find that when the

²³ GALLEA (M.). Action du formol sur les émulsions de virus rabique de rue ; vaccination du lapin contre la rage avec le virus de rue inactivé par le formol.—*C.R. Soc. Biol.* 1930. June 6. Vol. 104. No. 19. pp. 520-522.

²⁴ IYENGAR (K. R. K.) & BEER (W. A.). Studies in the Value of Etherized Sheep Vaccine in the Prophylactic Treatment of Rabies. Part I. The Effect of Ether on "Fixed Virus" in Infected Brains of Sheep.—*Indian J. Med. Res.* 1930. July. Vol. 18. No. 1. pp. 1-4. [3 refs.] [Pasteur Inst. of Southern India, Coonoor.]

brain is cut into large pieces, immersion for 84 hours has no effect upon virulence. When the pieces are small (minced) immersion for 72 hours attenuates, and immersion for 96 hours kills the virus.

For a number of years REMLINGER and BAILLY²⁵ have used dogs and herbivora for the production of fixed virus for use, after being etherized, on animals. The brain of a dog affords the same quantity of vaccine as 10 rabbits.

A statistical summary of the experience of antirabic vaccination of man during the years 1891–1928 at the Pasteur Institute of Saigon (Cochin China) is presented by BABLET and others.²⁶ The resistance of the Saigon strain of fixed virus to desiccation, and to dehydration in glycerine has notably diminished. This diminution is of the same order as that observed by BURNET in Tunis. The incubation period of street virus rabies is shorter in Saigon than it is in Europe (BABES). The method of treatment employed is the glycerine method of CALMETTE. Since 1925, only cords which have been desiccated for 2 to 6 days are employed, and these are not preserved in glycerine for more than 10 days. From 1891 to 1929 a total of 9,000 persons have been treated, and in only 2 cases have untoward paralytic symptoms been observed. These were of a slight nature, and recovery was rapid.

The number of persons treated annually rose from 26 in 1891, to about 60 between the years 1892 and 1902; to between 100 and 150 from 1902 to 1916, and then rapidly increased until in 1928 it had reached 1,273. The failure rate has correspondingly declined since 1892 when it was 5 per cent. to below 0.6 per cent. in later years. The mean number of failures per annum is 0.15 per cent. since 1908. If persons dying within 15 days after the completion of treatment are included, the mean mortality is 0.39 per cent. Numerous tables relating to statistics from 1908–1928 are included in the report.

From these it appears that Europeans number 1,574, as compared with 7,581 indigenous persons. The distribution of bites is as follows: On the head 421, of which 14 terminated fatally; on the hands 2,424, of which 7 were fatal; on the leg 6,263, of which 9 were fatal. Total 9,108, with 30 deaths.

The statistics of the Pasteur Institute in Paris for the year 1929 are presented by VIALA.²⁷ Of 542 persons treated none developed rabies. Since 1911 when CALMETTE's glycerine method was adopted no accident, paralytic or other, has been observed.

OUCHAKOV²⁸ furnishes statistics regarding 1,046 persons treated at a Russian Institute. Of these one succumbed (mortality 0.09 per cent.). The method employed was that of FERMI.

²⁵ REMLINGER (P.) & BAILLY (J.). Substitution du cerveau de chien au cerveau de lapin dans la préparation du vaccin antirabique vétérinaire.—*C.R. Soc. Biol.* 1930. May 9. Vol. 104. No. 15. pp. 18–19. [1 ref.] [Pasteur Inst. of Morocco, Tangiers.]

²⁶ ARCHIVES DES INSTITUTS PASTEUR D'INDOCHINE. 1929. Oct. No. 10. pp. 3–33. With 2 charts. [56 refs.]—La rage et la vaccination antirabique en Cochinchine.

²⁷ VIALA (Jules). Les vaccinations antirabiques à l'Institut Pasteur en 1929.—*Ann. Inst. Pasteur*, 1930. May. Vol. 44. No. 5. pp. 619–623.

²⁸ OUCHAKOV (V.). Service antirabique de l'Institut de Médecine Expérimentale. (Rapport annuel pour l'année 1929).—*Arch. Sci. Biol.* 1930. Vol. 30. No. 4. pp. 507–516. [In Russian. French summary pp. 516–517.]

D'AUNOY and MILLER²⁹ report on the operations of the Pasteur Institute of New Orleans (U.S.A.) during the year 1929. The method used is that of SEMPLE (4 per cent. brain substance in $\frac{1}{4}$ per cent. phenol after 24 hours incubation at 37.5° C.). Of 766 patients treated one who was severely bitten on the face succumbed to rabies. No post-vaccinal paralyses were encountered.

A statistical review of treatment at Oddzialu (Poland) is presented by KARŁOWSKI.³⁰ The summarized figures are as follows :—

	At Oddzialu.		At out stations.
1924	2,552 (8)	200 (0)	0
1925	905 (6)	352 (2)	0
1926	804 (1)	0	1,577 (5)
1927	399 (3)	0	1,496 (1)
1928	0	233 (0)	944 (1)
	4,660 (18)	785 (2)	4,017 (7)

The number of fatal cases is given in brackets. Patients in the second two columns were treated with carbolized vaccine. The first two columns, I gather, refer to persons treated at the Institute, and the third to those treated at out stations.

A résumé of antirabic treatment in the French colonies is presented by BOYÉ.³¹ 263 persons have been treated with no deaths, at *Dakar* in French West Africa. "A number" have been treated at *Brazzaville* in Equatorial West Africa with no untoward results. In *Madagascar* 67 persons were treated during 1927 with no deaths.

With regard to Indo-China: at *Hanoi*, in 1927, 538 were treated, of whom 5 succumbed from rabies; at *Saigon*, in 1927, of 1,431 treated, 1,136 completed treatment, and 4 died of rabies during its course; at *Huế*, of 256 who completed treatment one died; at *Laos*, 28 persons were treated with no deaths.

Antirabic treatment was commenced in Malaya in 1924. LEWTHWAITE³² discusses the question of centralization, and states that in Malaya a compromise has been adopted, a central institute operating at Kuala Lumpur, from which vaccine is transmitted to practitioners in the provinces, who have undergone a course of instruction at the central institute. The method of SEMPLE has been followed. As there are no wolves or jackals in Malaya an attempt was made to control the spread of the disease by inoculating dogs according to the Japanese method, using fixed virus first from the sheep, and later, for reasons of economy, from the buffalo calf. It is stated that the brain and cord of an Australian sheep yield some 60 doses of vaccine,

²⁹ D'AUNOY (Rigney) & MILLER (J. W.). Report of the Pasteur Institute of the Charity Hospital for the Year 1929.—*New Orleans Med. & Surg. J.* 1930. June. Vol. 82. No. 12. pp. 864-866. [Charity Hosp., New Orleans.]

³⁰ KARŁOWSKI (Zenon). Działalność oddziału pasteurowskiego w Roku 1928. Aktivité de la section antirabique de l'Institut.—*Medycyna Doświadczalna i Społeczna*. Warsaw. 1930. Vol. 12. No. 3/4. pp. 257-274. [In Polish.]

³¹ BOYÉ. Le service antirabique dans les colonies françaises.—*Bull. Office Internat. d'Hyg. Publique*. 1930. May. Vol. 22. No. 5. pp. 932-935.

³² LEWTHWAITE (R.). The Prophylaxis of Rabies in Malaya.—*Malayan Med. J.* 1930. June. Vol. 5. No. 2. pp. 66-67.

whereas those of a buffalo calf, from one to two years of age, and costing twice as much as a sheep, yield some 300 doses. The course of rabies in the buffalo calf differs in no way from that in the sheep, the incubation period for fixed virus being in both instances 6 days. More than 3,000 dogs were inoculated in January of this year, and the beneficent effect of this measure upon the endemicity of the disease will, it is expected, appear in due course.

v. *Post-vaccinal Paralyses.*

The following statistics of paralytic accident after antirabic treatment by various methods, collected in the United States from January, 1929, to April, 1930, are given by McCoy.³³

Type of treatment..	Cases treated.	Paralyses.	Ratio.	Remarks.
Killed virus (Semple method and modifications)	17,645	6	1:2,941	{ 4 fatal, 2 partial recovery.
Frozen and desiccated virus (Harris method and modifications)	4,148	2	1:2,074	2 recovered.
Living diluted virus (Högyes method and modifications) ...	2,593	0	—	—
Attenuated virus (Pasteur method)	1,077	0	—	—

At the Hygienic Laboratory "there were during the nearly 13 years in which we produced antirabic vaccine, 4 known cases among over 1,800 persons treated." [These figures are not in accordance with those published from other institutes, and the author advises caution in their interpretation. The most unusual factor is the high mortality rate of accidents occurring after treatment by killed carbolized vaccine. A case of this type is reported by STUART and KRIKORIAN (below), but such instances, so far as present experience goes, are very rare. Full particulars regarding the cases collected by McCoy would be of great benefit to those engaged in antirabic treatment.] As a contrast to McCoy's figures I may quote from the figures collected by the League of Nations, and published in their first report.²¹

	Number treated.	Accidents.	Ratio.
Dried cords	2,318	5	1:464
Dilutions... ..	6,362	2	1:3,181
Phenol vaccines	17,538	1	1:17,538
Ether (not killed)	3,634	0	—
Ether killed	1,356	0	—

³³ McCoy (G. W.). Antirabic Vaccine Paralysis. Consideration of Various Vaccines.—*Public Health Rep.* 1930. Aug. 15. Vol. 45. No. 33. pp. 1888-1891.

Those treated by dried cords may be further subdivided: In the case of 399 the cords had not been submitted to the action of glycerine and amongst these one non-fatal accident was observed. In the case of the remaining 1,919 the cords had been glycerinated; amongst these 4 exhibited symptoms of paralytic accident, none of which had a fatal termination.

Of the two cases of accident after treatment by the dilution method one terminated fatally. The single case reported after treatment by phenol vaccines (at Lwow, by Mulford's vaccine) recovered.

A statistical review of the occurrence of paralytic accidents in Siberian institutes is presented by LAMAKINE.³⁴ NÉBOLABOV has found in the literature descriptions of 20 cases prior to 1915. DOUBROVINSKY quotes 48 cases prior to 1924. "It is certain that this figure is much below the reality." The author quotes 5 cases at Tomsk in 1922, all of the Landry type, three of which terminated fatally. The dried cord method was employed at Tomsk from 1906 to 1923. Up to 1914, 10,791 persons had been vaccinated without accident. The first case was reported in February, 1914. From 1914 to 1923 with the same treatment, 11,031 persons were treated without complication. In 1923 the dried cord method was replaced by that of HÖGYES and up to 1926, 1,739 persons were treated with no untoward results, and with a mortality of 0.2 per cent. Cases are carefully followed up, reports being received after from 3 to 6 months from 80 per cent. of those treated. It is only since 1926 that an undue number of paralytic accidents has been observed, 5 at Novo-Sibirsk, 3 at Barnaul, 2 at Minusinsk and 1 at Irkutsk. Out of a total of 4,500 persons treated during 1927 at the above centres, then, 17 cases have occurred, and 10 of these terminated fatally, i.e., 3.8 per mille of occurrence, with a fatality of 58.8 per cent. [This review is taken from the French summary. There are many points upon which further information would be welcome. It is not possible, even with the additional information furnished by the U.S.S.R. in the League of Nations report,²¹ to state precisely what method of vaccination was employed. In that report 9 cases of accident after treatment by the Högyes-Phillips method with 6 deaths; 8 cases by the Pasteurian method with no deaths; and 3 cases by Fermi's method of which one terminated fatally, are stated to have occurred during the year 1927.]

A case of fatal neuro-paralytic accident of Landry type, following treatment by killed carbolized vaccine is described by STUART and KRIKORIAN.³⁵ The patient had no obvious neurotic tendency. On the day when he had received his last (14th) injection, symptoms of muscular weakness commenced. These rapidly progressed—on the next day he could not raise his arms; the legs were totally paralysed, as was also the bladder. On the 3rd day both arms were completely paralysed. A transfusion of blood was given. Death supervened early on the 5th day. The patient had received 0.7 gm. of nervous substance in all, in 5 cc. doses of a 2 per cent. emulsion in 1 per cent. phenol, incubated at 37° C. for 24 hours. The authors then discuss paralytic accidents in general, and refer to their own experiments

³⁴ LAMAKINE. Complications consécutives aux vaccinations anti-rabiques.—*Rev Méd. de Sibérie* Novo-Sibirsk 1929. June-July. pp. 56-76. [Summarized in *Bull. Office Internat d'Hyg. Publique*. 1930. May. Vol. 22. No. 5. pp. 1022-1023.]

³⁵ STUART (G.) & KRIKORIAN (K. S.). A Fatal Neuro-Paralytic Accident of Antirabies Treatment.—*Lancet*. 1930. May 24. pp. 1123-1125. [9 refs.] [Central Labs., Health Dept., Jerusalem.]

(this *Bulletin*, Vol. 26, p. 732). They believe that the causal factor is nerve substance, whether homologous or heterologous. In rabbits and white rats its effects can be prevented by exposure to phenol and heat: but "apparently in the basic nerve substance of all anti-rabies vaccines, there exists some deleterious component which, although adversely affected by several physical and chemical agencies, is still capable, in peculiarly susceptible human beings, of exciting symptoms of those nervous disorders classified as paralytic accidents of antirabic treatment." This component has not as yet been identified. Actual occurrence is governed by individual idiosyncrasy.

vi. Rabies in Animals.

A very complete résumé of the practice and results of antirabic treatment as applied to the larger farm animals which have been bitten by rabid dogs (etc.) is given by STOLNIKOFF.³⁶ After an exhaustive survey of the literature bearing on the subject, and a critical examination of the success which is claimed for the various methods which have been employed, the author pleads for a thorough examination of the solidity of the immunity conferred, and of its commencement and duration. With this object in view he recommends the collection of complete statistics regarding the untreated as well as the treated. All observations must be thoroughly controlled, and every effort should be made to find an experimental basis for the comparison of the various methods which have been adopted. [The attention of veterinarians is specially directed to this important paper. The solution of the problem is fraught with difficulties. The statistics are few, and the additional complexity due to the wide range of size and species of the animals under consideration further obscures the issue. Indian, Japanese and Russian authorities have recognized the importance of acquiring more definite information regarding the efficacy of treatment in these cases, and it is to be hoped that in time some definite results will emerge.]

Attention is drawn by STEEVENSON³⁷ to the frequency of pyrexia as a premonitory symptom in horses, mules and donkeys. In five serial cases observed during the years 1927 and 1928 at Sialkot (India) the animals were admitted to hospital on a diagnosis of simple fever and symptoms of rabies did not appear until the second or third day of detention. This is an important point in veterinary practice in countries where rabies is endemic.

REMLINGER and BAILLY³⁸ have inoculated 15 frogs (*Bufo mauritanicus*) with a virulent street virus. Three have remained alive for 535 days; nearly all the others died between the 162nd and the 465th day. In each case of death the brain was subpassaged, with negative result. Thus *Bufo mauritanicus* is completely refractory even as *Rana temporaria* is.

³⁶ STOLNIKOFF (W. I.). Die gegenwärtige Anwendung von Schutzimpfungen gegen Tollwut an grossen Landwirtschaftstieren.—*Ztschr. f. Infektionskr. d. Haustiere*. 1930. May 12. Vol. 37. No. 3/4. pp. 234-251. [43 refs.]

³⁷ STEEVENSON (G. F.). A Note on the Occurrence of Pyrexia as a Premonitory Symptom of Rabies in Horses.—*Jl. Roy. Army Vet. Corps*. Aldershot. 1930. Aug. Vol. 1. No. 4. pp. 250-251.

³⁸ REMLINGER (P.) & BAILLY (J.). Le crapaud (*Bufo mauritanicus*) est réfractaire à la rage.—*C.R. Soc. Biol.* 1930. Nov. 14. Vol. 105. No. 30. pp. 353-355. [1 ref.] [Pasteur Inst. of Morocco, Tangiers.]

REMLINGER and BAILLY³⁹ report in greater detail their observations on rabies in the cock and pigeon described in my previous summary (this *Bulletin*, Vol. 27, p. 753). From further experiments on pigeons they show that these birds do not appear to react to the virus as the cock does, by the production of the phenomenon of latency.

JONESCO^{40, 41} reports that he has fixed a strain of virus obtained from a wolf by 16 successive subpassages through dogs. The virus now in its 30th passage remains fixed. He also advises that a fixed virus so prepared should be used for the vaccination of dogs.

REMLINGER⁴² discusses the possibility of introducing the antirabic vaccination of dogs into France. He considers it to be practical. He believes that the duration of immunity may be about three years. The treatment does not cause local accidents. It is not infallible; doses of 120 cc. of ether emulsion are sufficient to immunize. The method is simple, efficacious and inoffensive; it should be authorized in France where a number of institutes are in a position to prepare the necessary doses.

A monograph by VAN HUYEN⁴³ is summarized by PANISSET. It relates to researches on glycono-formol vaccine in the treatment of dogs. No details of these researches are given in the summary. A communication dealing with antirabic treatment in general is submitted by VERGE and VAN HUYEN.⁴⁴

vii. *Miscellaneous.*

HERRMANN⁴⁵ in investigating the duration of immunity in animals which have received a course of treatment, has found that in certain of these the immunity is solid and may last for a year. Although this immunity is solid in many cases, it has never been absolute, as was shown by repetitions of the test dose. In the majority of cases, however, the duration of the immunity is much less than a year. [The duration of immunity is not an easy magnitude to determine. The numbers of animals available for testing after long periods must of necessity be few. The observations quoted in this paper whilst adding to our knowledge do not elucidate the problem. It is not often that a person is bitten twice by a rabid animal during a comparatively limited period of time, and when such cases do occur, it would appear inadvisable to depend upon the immunity conveyed by a previous course of antirabic treatment.]

³⁹ REMLINGER (P.) & BAILLY (J.). Comportement du virus rabique dans l'encéphale du coq et du pigeon.—*Ann. Inst. Pasteur*. 1930. July. Vol. 45. No. 1. pp. 42-53. [3 refs.] [Pasteur Inst., Tangiers.]

⁴⁰ JONESCO (Demetre). Le virus rabique fixe pour le chien.—*C.R. Soc. Biol.* 1930. June 20. Vol. 104. No. 21. pp. 717-719.

⁴¹ JONESCO (Demetre). Vaccination préventive antirabique des chiens au moyen du virus fixe pour le chien.—*C.R. Soc. Biol.* 1930. June 20. Vol. 104. No. 21. pp. 719-720.

⁴² REMLINGER (P.). La vaccination antirabique préventive du chien doit être autorisée en France.—*Rec. de Méd. Vét.* 1930. Sept. Vol. 106. No. 9. pp. 526-530. [3 refs.]

⁴³ VAN HUYEN (Pham). La vaccination antirabique chez les animaux. Recherches sur un vaccin glycono-formolé.—*Bull. Acad. Vét. de France*. 1930. July. Vol. 3. No. 7. pp. 316-318.

⁴⁴ VERGE (J.) & VAN HUYEN (Pham). Recherches sur la vaccination antirabique du chien.—*Rec. Méd. Vét.* 1930. May. Vol. 106. No. 5. pp. 249-268.

⁴⁵ HERRMANN (Otto). Dauer des Impfschutzes gegen Lyssa.—*Zent. f. Bakt. I. Abt. Orig.* 1930. June 3. Vol. 117. No. 1/3. pp. 141-145. [6 refs.] [Lenin State Inst. for Med. Research, Kasan.]

The view of JOSEPH KOCH that antirabic inoculation has a deleterious effect on chronic tuberculosis is submitted to experimental test by GLUSMAN and GOLDENBERG.⁴⁶ From observations on guineapigs they have been unable to find any evidence to support KOCH's view. Immunity against rabies develops in tuberculous guineapigs in the usual manner. The presence of tuberculosis should not then be considered as contra-indicating antirabic treatment.

In continuation of a previous communication (this *Bulletin*, Vol. 26, p. 221), LEGEZYNSKI and MARKOWSKI⁴⁷ report further observations. The negative results which they obtained in their previous series of experiments contrasting various methods of treatment are ascribed to the destruction of the immunizing properties of the vaccines by 1 per cent. phenol, and to plurality of strains.

Prior to the Great War there was no Pasteur Institute in the territory now called Czechoslovakia.⁴⁸ An institute was opened at Košice in 1928. The vaccine employed in the first instance was formalized, "after the method of Cumming." The method of Fermi is now employed. The vaccine is sent out in ampoules, which contain a suspension of 5 per cent. of brain substance filtered through a triple layer of gauze, in $\frac{1}{2}$ per cent. phenol.

A more or less general communication by DE FREITAS⁴⁹ deals with experimental studies carried out at the Pasteur Institute at Pernambuco. These relate to points which have already for the most part been accepted. Although no figures are given to support his contentions, the author states that the dried cord and Högyes methods of treatment are equally effective, and that preventive inoculation of animals with single doses of phenol glycerinated vaccine from cords of vaccinated dogs and from rabbits' cords containing fixed virus "have been very successful."

BARCHI⁵⁰ describes the effects of colloidal sulphide of arsenic, colloidal sulphide of antimony, and "Pallina da caccia" on guineapigs which had previously been inoculated with fixed virus. Four animals were treated with the first drug, 3 with the second, 4 with the third, and there were three control animals. The injection was given intravenously. A further series were similarly treated with other chemical (one animal in each case). It appeared that colloidal suspensions of lead, antimony, tin, arsenic, had no influence on the course of the disease.

MARIE and URBAIN⁵¹ report experiments which show that whilst salicylate of soda has a destructive action on the virus *in vitro*, it has

⁴⁶ GLUSMAN (M. P.) & GOLDENBERG (J. I.). Zur Frage ueber den Einfluss antirabischer Impfungen auf den Verlauf der experimentellen Tuberkulose bei Meerschweinchen.—*Ztschr. f. Immunitätsf. u. Experim. Therap.* 1930. Vol. 67. No. 1/2. pp. 187-196 [Sanit. Bact. Metschnikoff-Inst., Kharkov.]

⁴⁷ LEGEZYNSKI (S.) & MARKOWSKI (S.). Recherches expérimentales sur la vaccination antirabique chez le chien.—*C.R. Soc. Biol.* 1930. May 23. Vol. 104. No. 17. pp. 312-313. [3 refs.]

⁴⁸ BOUČEK (Jaromír). Laboratoire de production du vaccin antirabique.—*Trav. Inst. d'Hyg. Pub. Etat Tchecoslov.* 1930. Apr. Vol. 1. No. 2. pp. 43-48. With 4 text figs.

⁴⁹ DE FREITAS (Octavio). Estudos experimentaes sobre a raiva no Instituto Pasteur de Pernambuco.—*Archivos de Hyg.* Rio de Janeiro. 1930. May. Vol. 4. No. 2. pp. 127-138. English summary.

⁵⁰ BARCHI (Luigi). La chemioterapia della rabbia.—*Policlinico.* Sez. Med. 1930. Nov. 1. Vol. 37. No. 11. pp. 533-540. [33 refs.]

⁵¹ MARIE (A. C.) & URBAIN (Ach.). Pouvoir antirabique du salicylate de soude.—*C.R. Soc. Biol.* 1930. Sept. 20. Vol. 104. No. 26. pp. 1206-1208. [1 ref.]

neither curative nor prophylactic properties when administered *in vivo*.

BAILLY and MICHEL⁵² report the effects of antirabic treatment (three doses of REMLINGER's ether virus) on two dogs which suffered from paralyzes. The first was suffering from distemper, and exhibited symptoms of an ascending paralysis principally affecting the hind legs. Antirabic treatment was given, and contrary to the authors' expectations the paraplegia regressed from the 7th day after inoculation until recovery was complete. The second suffered from a general paralysis of meningomyelitic origin following a course of treatment by ether vaccine. After some months a second course was given, and recovery rapidly followed. The authors discuss the possible modes of action of the vaccine in these cases, and report these observations for the benefit of veterinarians, particularly with respect to the paraplegia of distemper.

A. G. McKendrick.

REMLINGER (P.) & BAILLY (J.). La vaccination antirabique des animaux et du chien en particulier au Maroc en 1929.—*Rev. Gén. de Méd. Vét.* 1930. May 15. Vol. 39. No 461. pp. 257-263. [1 ref.] [Pasteur Inst., Tangiers.] [See this *Bulletin*, Vol. 27, p. 755.]

REMLINGER (P.) & BAILLY (J.). La vaccination antirabique des animaux et du chien en particulier au Maroc en 1929.—*Rev. Vét. et Jl. de Méd. Vét.* 1930. July. Vol. 82. pp. 371-377. [1 ref.] [Pasteur Inst., Tangiers.] [See this *Bulletin*, Vol. 27, p. 755.]

⁵² BAILLY (J.) & MICHEL (R.). Essais de traitement de la méningo-myélite du chien par le vaccin antirabique.—*Rev. Gén. de Méd. Vét.* 1930. July 15. Vol. 39. No. 463 pp. 392-397. [6 refs.]

REVIEWS AND NOTICES.

HARVARD INSTITUTE FOR TROPICAL BIOLOGY AND MEDICINE. **The African Republic of Liberia and the Belgian Congo. Based on the Observations made and Material collected during the Harvard African Expedition 1926-1927.** [STRONG (Richard P.), SHATTUCK (George C.), THEILER (Max), WHITMAN (Loring), BEQUAERT (Joseph C.), ALLEN (Glover M.), LINDER (David H.), COOLIDGE (Harold J.), Jr., Members of the Expedition.]—pp. xxvi+ix+1064. In 2 volumes. With 476 illustrations (including 7 coloured plates), 28 text figs. & 9 maps. Contributions from the Harvard Inst. for Trop. Biol. & Med. No. V. 1930. Cambridge: Harvard Univ. Press.

The most significant single sentence in this voluminous and admirably illustrated report is the following: "Although the Expedition, numbering eight in Liberia and seven in the Belgian Congo, spent about a year in tropical Africa, no member of it contracted dysentery or suffered from severe diarrhoea." Three methods of chlorinating water with calcium hypochlorite proved unsatisfactory; halazone tablets proved useful and sufficiently stable for practical purposes for chlorinating water in canteens while on the march. Turbid waters were boiled. There was no serious illness among the members of the Expedition, only a few mild attacks of fever being recorded; the malaria prophylaxis consisted of 15 grains of quinine on each of two successive days weekly. This record speaks well for the efficiency of the precautions taken to prevent disease.

The purpose of the Harvard Expedition was to make a biological and medical survey of Liberia, a country of which little is known in these respects, and the authors may well be congratulated if the general value of their survey comes up to the standard reached in their account of the medical conditions found in Liberia.

The picture painted of the medical administrators of this republic of negroes is not flattering, either to their accomplishments or to their intentions. It is well that a report of this kind should draw attention to the utter inadequacy of the medical assistance afforded to the mass of the Liberian people. The authors point out that Liberia, like Sierra Leone, constitutes a home for freed slaves and that the populations are about equal. Liberia has the lowest *per capita* expenditure, revenue and trade in Africa, yet has six times the public debt of Sierra Leone. Liberia maintains one poorly paid Liberian physician in Monrovia as against a staff of twenty-two medical officers in Sierra Leone. The government of Liberia spends almost nothing on the improvement of the condition of the people.

The Expedition records the absence from Liberia of plague and relapsing fever and also curiously the absence of *Cordylobia* infection. They discuss yellow fever and the prevalence of some of the vectors; they deal with malaria and emphasize the superiority of the blood examination over spleen enlargement as a guide to its prevalence. Under schistosomiasis it is observed that in Liberia only one case of rectal infection with *S. haematobium* was seen, the usual form being vesical as in Sierra Leone. They encountered *S. mansoni* eggs apparently with some frequency in the faeces and once in the urine. They observe that MAASS had not found *S. mansoni* in Liberia. [If *S. mansoni* is common in Liberia this would constitute a difference from the findings in Sierra Leone. Dr. MAASS informed the reviewer that he had found several cases in his patients, not Liberians, but people from the French Territory.] On the other hand, terminal spined eggs were found in the faeces in several cases in the parts of the Belgian Congo round Stanleyville. The ova measured 162 to 169 μ by 54 to 64 μ . The measurements of ova given for *S. spindalis* are 163 to 258 μ by 46 to 70 μ and for *S. bovis* 160 to 180 μ by 50 to 60 μ . Antimony

thioglycollamide was tested in schistosomiasis with some success, and further trial is recommended.

Guineaworm infection is not common in Liberia, only one case being seen during the expedition. Onchocerciasis is prevalent and the Expedition confirmed the developmental cycle of this worm in *Simulium damnosum* in Liberia. It is not clear whether the breeding place of this insect has been discovered or not. On page 240, "We were successful in finding its breeding place about a mile from our camp in a swiftly flowing stream" (figured); on page 856, "at the time, these larvae and pupae were believed to be those of *E. damnosum*, although no adult flies were bred from them." The authors point out that their specimens differ conspicuously from the descriptions by KING and POMEROY. Hookworm infection amounted to 84 per cent. at one station, and *Ascaris* to 60 per cent. Rarely observed were gonorrhoea, hydrocele and aneurysm [this constitutes a marked difference from the conditions found in Sierra Leone]. Although several cases of sleeping sickness were diagnosed the conclusion reached is that it is not common, and it is noted that tuberculosis appears to be rare inland. That important group of diseased conditions in which various fungi have been described as the causative organisms receives a good deal of attention, but the authors are conservative in their conclusions.

This report will be of great interest to all who have some concern for African peoples and their advancement, and it will be of special value to those—mostly American presumably—who propose to enter Liberia.

D. B. Blacklock.

IMMS (A. D.) [M.A., D.Sc., F.R.S., Chief Entomologist, Rothamsted Experimental Station, Harpenden]. **Recent Advances in Entomology.**—pp. viii+374. With 84 text figs. 1931. London: J. & A. Churchill, 40, Gloucester Place, Portman Square. [12s. 6d.]

The advances and developments discussed in this volume show us Entomology, as always, a diversely interesting province of biology, and remind us that in its application to the life-history and the biological control of the insect-pests of agriculture entomology has now become a scientific profession of universal importance to mankind.

About half the contents of the volume are pure science—surface anatomy and morphology, interpretation of larval types and of metamorphosis, palaeontology and phylogeny, sense organs, sensory responses and reflex behaviour, and the nature and sources of insect colouring. All here is instructive and concise, and the chapters dealing in particular with sensory responses and reactions will well repay the attention of the medical officer abroad, who nowadays has to be something of a medical entomologist.

The other half of the book is devoted to insect ecology and parasitism as the scientific base of operations in the biological control of insect pests of agriculture. Insecticides and their use, and the insects that afflict man and other vertebrates, are definitely excluded; but this should not repel the medical zoologist, who will here discover what a world of careful observation and forethought must precede and accompany the difficult work of waging biological warfare against noxious insects even in a *well-cultivated environment*. Under ecology certain conditions of insect life that are open to exact experiment are discussed, also climate and season, and symbiotic micro-organisms. A chapter on ecology in its application to treatment and antidote for insect pests of agriculture ("cultural control") lies in the indeterminate and rather elevated land where all the daughters of Biology and Physiology hopefully osculate with Demeter; it lies outside the borders of this *Bulletin*. A general survey of insect parasitism and its various types, phases and complexities leads up to and illustrates the theory and practice of "biological control," the theory and practice of deliberately engaging carefully sought and chosen predatory and parasitic insects to harry and

hold in check the insect pests of food-crops and growing timber and certain kinds of brushwood that in sundry parts of the world stifle pastures.

The story of the biological control of insect-pests of agriculture is material for a fifth Georgic, and although its setting and staging and its recurrent episodes lie outside the province of this *Bulletin* the present version of the story is well worth the attention of those of our readers who at times are concerned with the insect-pests of man and domestic animals.

A. Alcock.

KIRK (J. Balfour) [M.B., Ch.B.Ed., D.P.H.Oxon, D.T.M. & H.Eng., Colonial Med. Service, Director, Med. & Health Dept., Mauritius, etc.]. **Hints on Equipment and Health for Intending Residents in the Tropics.** Second Edition.—pp. xii + 128. 1931. London: Baillière, Tindall & Cox, 7 & 8, Henrietta Street, Covent Garden, W.C.2. [3s. 6d.]

Very little alteration has been made in this second edition of Dr. Balfour Kirk's useful book, but opportunity has been taken to make a few verbal alterations and to incorporate additional hints and suggestions communicated to the author by readers of the first issue. The most important addition is a short chapter on *Your Dog*; in it information is imparted as to the early signs of rabies and the measures to be taken if such are noticed. "If, after ten days, your dog shows no sign of hydrophobia [suspicious symptoms having previously been observed] set your mind at ease regarding the family, even if he should have bitten a member of the household. He will not have infected anyone in this case" (p. 108). This statement, though correct as a general rule, ignores the danger of intermittent, or remittent, rabies which may be very real (see this *Bulletin*, Vol. 24, p. 223). The book is pleasantly written, full of sound hints, and will doubtless maintain the popularity gained by the first issue.

H. H. S.

TROPICAL DISEASES BULLETIN.

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[No. 4.

AMOEBIASIS AND DYSENTERY.

AMOEBIASIS.

PHILIPTSCHENKO (A. A.). **The Occurrence of Intestinal Protozoal Infections in the Inhabitants of Leningrad (U.S.S.R.) with Special Reference to *Entamoeba histolytica* Carriers.**—*Ann. Trop. Med. & Parasit.* 1930. July 8. Vol. 24. No. 2. pp. 165-175.

Six hundred and four persons were examined in Leningrad for intestinal parasites, one examination in each case. Amongst the group of 400 food-employees, 262 (65.5 per cent.) were found infected with various protozoa; *E. histolytica* was discovered in 91 cases (22.75 per cent.); 189 (47.25 per cent.) of these employees suffered from various gastro-intestinal disorders. Of 162 adult non-dysenteric patients treated in the dispensary for various gastro-intestinal disorders, 101 (62.4 per cent.) were found to be infected with various protozoa; *E. histolytica* was discovered in 41 cases (25.3 per cent.). An investigation of 42 child dispensary patients suffering from various gastro-intestinal disorders showed that 20 were infected with various protozoa. In four cases *E. histolytica* infections were found.

The evidence resulting from the measurement of *E. histolytica* cysts rather contradicted BRUMPT's suggestion of the existence of non-pathogenic entamoebae with small four-nucleated cysts. On the other hand, the presence in half of the cyst-cases of different sizes of cysts seemed to confirm the view of DOBELL, BOECK, and others as to the existence of different races of one *E. histolytica*.

H. M. Hanschell.

PHILIPTSCHENKO (A. A.). ***Entamoeba histolytica* and Other Protozoa in Two Hundred and Twenty-five Cases of Acute Aestival Diarrhoea admitted to the Botkin Barracks Hospital at Leningrad (U.S.S.R.).**—*Ann. Trop. Med. & Parasit.* 1930. July 8. Vol. 24. No. 2. pp. 177-187. [3 refs.]

Only those patients were noted as harbouring *Entamoeba histolytica* who disclosed: (1) *Entamoeba* containing red blood corpuscles, (2) cysts of *E. histolytica* (associated or not associated with motile stages), (3) motile stages of *Entamoeba* not containing red blood corpuscles, no cysts present, but the *Entamoeba* characterized by complete absence of ingested material, by sharp differentiation between endo- and ecto-

plasm, or by a nucleus showing the typical features of a delicate nuclear membrane with single layer of minute chromatin grains on its inner surface, a minute karyosoma situated in centre of nucleus, and no chromatin between karyosoma and nuclear membrane. All doubtful cases not showing clearly the above characters were noted as *E. coli*.

From July 1st to August 31st, 225 patients with various acute intestinal affections were examined, and 110 (49.0 per cent.) were found infected with various protozoa. *E. histolytica* was found in 32 cases (14.2 per cent.); in 13 of these (5.8 per cent.) the *E. histolytica* contained red blood corpuscles. As 173 cases were examined only once each, the real figures of *E. histolytica* infection should be considerably increased; it may be said that about 15 to 20 per cent. of acute aestival diarrhoea cases are true amoebic dysentery. Bacillary dysentery amongst these 225 cases was found in 22 (9.8 per cent.) and only in one case was it combined with amoebic. Prevalence of intestinal protozoa in general, and of *E. histolytica* especially, makes a protozoological examination of all acute intestinal disorders absolutely indispensable.

H. M. H.

CUSUMANO (A.). La diffusione dell' "*Entamoeba histolytica*" in Sicilia. [The Spread of *Entamoeba histolytica* in Sicily.]—*Polí-clinico*. Sez. Prat. 1930. Oct. 13. Vol. 37. No. 41. pp. 1489-1490.

A recent promulgation of the health authorities of Palermo calling the attention of medical men to the existence of amoebiasis in that Province has led the author to state that the condition is of equal severity in Trapani, Caltanissetta, Agrigento, and in fact over most of the island. The symptoms produced are: in children dysentery, in adults spastic colitis and diarrhoea alternating with constipation. Less common are the appendicular syndrome, symptoms resembling those of cholecystitis, or duodenal trouble. [The value of this paper is somewhat discounted by the statement that "vegetative forms of the amoeba have been met with in various organs besides the liver, such as the brain, lung, spleen, pericardium, heart, joints, urinary system, lymph glands and peripheral vessels," adducing no proof of this extraordinary dictum.]

H. H. S.

CRAIG (Charles F.). The Diagnostic Value of the Complement Fixation Test in Amebic Infections.—*Jl. Amer. Med. Assoc.* 1930. July 5. Vol. 95. No. 1. pp. 10-13. [8 refs.] [Army Med. School, Washington.]

In July 1927 the author first called attention to the fact that alcoholic extracts of cultures of *E. histolytica* possessed marked complement binding power when used as antigen in complement fixation tests of individuals infected with that parasite [see this *Bulletin*, Vol. 25, pp. 228 and 623]. In this paper he gives his results obtained with this test up to March 30th, 1930; and discusses its value in diagnosis of *E. histolytica* infections based on his experience of it during nearly three years.

Of 689 cases in which the faeces were examined for entamoebae 84 (12 per cent.) gave a positive C.F.T. reaction; 71 gave a clear-cut 4 plus reaction, and the rest a clear-cut 3 plus reaction. Of these 84

the faeces disclosed *E. histolytica* in 77. In 13 [? 7] the amoeba was not found in one or two examinations.

Six hundred and five cases gave negative C.F.T. reaction. In these, *E. histolytica* was found in the faeces of 5 (0·8 per cent.). One of these five was a severe acute case of amoebic dysentery; one was an abscess of liver; one patient was symptomless; whilst the other two had suspicious gastro-intestinal symptoms.

One hundred and fifty-nine (26·2 per cent.) of the patients giving negative C.F.T. reaction were found to be infested with some species of amoeba other than *E. histolytica*. Thirteen of the 84 patients giving positive C.F.T. reaction with *E. histolytica* antigen also gave positive Wassermann and Kahn reaction; the remaining 71 gave negative Wassermann and Kahn reactions.

Of the 605 cases giving negative C.F.T. reaction (*E. histolytica*) 54 (9 per cent.) gave positive Wassermann and Kahn reactions; the remaining 551 (91 per cent.) gave negative Wassermann and Kahn reactions. Thus there were slightly more than 6 per cent. positive Wassermann and Kahn reactions in those giving a positive C.F.T. result with *E. histolytica* antigen than in those giving a negative result. It is also significant that of the 13 individuals giving positive reaction to all 3 tests, no less than eight failed to show *E. histolytica* in the faeces (2 examinations only of faeces). Apparently then in rare instances syphilitics will give a positive reaction with *E. histolytica* antigen. At the present time the practical value of the test is limited by the difficulty in preparing the antigen extract. The technique of the test is rendered more difficult by reason of fact that the antigenic extract is so weak in antigenic properties that it must be used undiluted. Therefore every step in the technique must be thoroughly controlled. The test is therefore still only for laboratories where services of competent serologists and protozoologists are available.

H. M. H.

PENSO (Giuseppe). Sopra un'ameba parassita della vescica urinaria *Entamoeba vesicalis* n. sp. (mihi). [**An Amoeba Parasitic in the Urinary Bladder.**].—*Ann. Med. Nav. e Colon.* 1929. Year 36. Vol. 1. No. 1/2. 24 pp. With 9 figs. on 1 plate. [48 refs.] English summary. [Inst. of Med. Parasit., Univ., Rome.]

After giving a useful review of the previous records of the occurrence of amoebae in urine, the author describes his own case—that of a child, eight years of age. The urine contained numerous deformed leucocytes and swollen and degenerate bladder cells. It gave a heavy deposit of crystals of calcium oxalate. In addition to the cells there were numerous slowly moving amoebae of 20 to 40 microns in diameter. The urine was examined once a week for two months and the amoebae were constantly present in large numbers. Amoebae were absent from the mouth and intestine. In the urine the amoebae remained alive for five to seven days, and multiplication by division could be followed. Uninucleate cysts are also described. The amoebae in the free and encysted stage, as they appear after staining with methylene blue and eosin without fixation, are shown in a plate. [There is nothing to indicate that the encysted stage is what it is supposed to be, and this combined with the fact that the amoebae were unsustainable by any of the ordinary methods which readily succeed with every known amoeba leads the reviewer to suspect that degenerate cells may again have been

mistaken for parasites.] On the strength of his observations the author introduces a new name—*Entamoeba vesicalis*. C. M. Wenyon.

VENTURI (Luigi Carlo). Contributo allo studio della cistite amebica. [**Amoebic Cystitis.**]—*Arch. Ital. Sci. Med. Colon.* 1930. Aug. 1. Vol. 11. No. 8. pp. 465–473. With 1 text fig. [10 refs.] English summary (6 lines).

The author gives brief reference to many reports, since that of BÄELZ 1883, of urinary amoebiasis. His own case, here reported and discussed in detail, was that of a man 38 years old. Illness began with fever, hypogastric pain, vomiting, followed by frequent micturition; perineal pain; escape of blood from external urinary meatus. Pain and tenderness over bladder. The patient denied any previous venereal disease, or exposure to venereal infection. Urine withdrawn by catheter was very turbid, reddish, slightly acid; sp. grav. 1018; and contained trace of albumen. Microscopical examination of the sediment revealed very few bacteria; no casts; many white cells, some breaking down; very many intact erythrocytes, and also large cells, some protruding large pseudopodia, whose protoplasm contained an indistinct marginal nucleus, and numerous inclusions, especially red blood cells in various stages of digestion; no included bacteria. Some of these cells showed well differentiated ecto- and endoplasm and contained nuclei in various numbers. Careful search failed to detect gonococci or Koch's bacillus. Two guineapigs were intraperitoneally inoculated with the urinary sediment. They were killed after one and two months respectively—no abnormalities were found in their internal organs. The patient's faeces revealed cysts of *Entamoeba histolytica*, no other protozoa and no helminth ova were detected. (The patient had suffered, from time to time, from slight transient attacks of mucosanguineous diarrhoea.) The urinary sediment was injected into the rectum of a kitten; and the kitten's rectum sealed for two days. No amoebic infection of the kitten resulted. [Nevertheless, the author declares] the diagnosis of amoebic cystitis was not in doubt, for besides finding in the fresh material the large vegetative forms and smaller "precystic" "more resistant" forms, examination of smears of the urinary sediment, Schaudinn-fixed, and Giemsa- or iron-haematoxylin-stained, disclosed, in smaller numbers than in the fresh preparations, amoebae possessing the typical structure of *E. histolytica*, with excentric nucleus and chromatin masses disposed discretely on the nuclear membrane. The patient's symptoms had vanished completely after 12 days' treatment by stovarsol, two tablets of 0.25 gm. each per os daily; and vesical lavage with 0.1 per cent. silver nitrate solution.

[The author illustrates this paper with a drawing of the bodies seen in the fresh unstained urinary sediment. The cells, even pseudopodic ones, show no differentiation between endo- and ectoplasm; and for the rest only characters common to entamoebae and tissue cells. Illustration of the diagnosed amoebae in the wet-fixed and iron-haematoxylin-stained smears would have been more to the point.] H. M. H.

GAMBIER (A.). Un cas de cystite aiguë amibienne. [**Case of Acute Amoebic Cystitis.**]—*Bull. Soc. Path. Exot.* 1930. May 14. Vol. 23. No. 5. pp. 457–458.

The patient, a native of Tonking, developed acute dysentery, diagnosed as amoebic, and rapidly relieved by emetine therapy. A few days later he passed purulent blood-stained urine. The author found in this urine, and on 19 occasions subsequently, large "amoebae," containing red blood cells, and with well-defined ecto- and endoplasm. These "amoebae" were immobile in centrifuged material, but in uncentrifuged urinary deposit definitely mobile.

The author declares that in the locality, Phnôm-Penh, amoebiasis and trichomoniasis are very common. Thus in one year he has carried out 463 positive examinations for dysentery amoebae, and 209 for trichomonas. He was thus well acquainted with these parasites. He was aware of DESCHIENS' insistence that the amoebic nature of this cystitis should be demonstrated by examination of wet fixed and stained preparations, and by inoculation into kittens; he had done neither, yet was positive of the amoebic nature of the haematophagous cells—additional evidence in support being that the cystitis and the haematophagous cells disappeared after 3 days' emetine treatment. DESCHIENS discusses the case, and notes that verifiable evidence, such as would be provided by wet fixed stained permanent preparations, as to amoebic nature of the haematophagous cells, is lacking, but suggests possibility of amoebic abscess forming during the dysentery attack in anterior wall of rectum and breaking through the thin prostatoperitoneal aponeurosis into bladder.

H. M. H.

PETZETAKIS. Amibhémie et abcès amibien primitif du poudmon sans dysenterie. "La forme amibhémique de l'abcès du poudmon." Sur un cas d'abcès primitif du poudmon, ayant été précédé d'un long état pyrétique d'allure septicémique pendant plusieurs mois, opéré sans amélioration et guéri rapidement après traitement émetinique. [*Amoebihaemia and Primary Amoebic Abscess of Lung.*]—*Bull. et Mém. Soc. Méd. Hôpil. de Paris*. 1930. July 21. Year 46. 3rd Ser. No. 25. pp. 1341–1349. With 6 text figs. [3 refs.]

A man 30 years old suffered for 2 months from fever with morning remission. There was no history of previous intestinal troubles nor did any develop during fever. Repeated examinations of the stools revealed no amoebae. Though on general grounds the case was counted as typhoid fever, repeated examinations of the blood proved negative. Clinical examinations during this prolonged pyrexia failed to detect any abnormality in lungs or in other viscera. Examination of sputa was negative. At end of the two months' fever the patient developed severe pain in right chest and fever became higher. Radiography disclosed a large abscess in right lower lobe of right lung. The patient was sent to hospital, exploratory puncture obtained pus, and operation then evacuated a large quantity. Examination of this pus revealed no amoebae. There was no fall of temperature and no improvement in patient's condition, when 5 days after operation scrapings of the abscess wall revealed amoebae. Emetine injections were given and within 24 hours temperature was normal and patient well on the road to recovery. Healing was complete under emetine treatment, final radiography disclosing apparently normal lung.

The author insists that the case demonstrates:—

- (1) preliminary lung amoebihaemia, manifested by fever.
- (2) "amoebic localization" by amoebic embolus in lung and rapid abscess formation.
- (3) insufficiency of operative treatment by itself.
- (4) the rapid influence of emetine.

He records, moreover, that, after operation and emetine therapy, the sputa [apparently found to contain amoebae only after these had been found in the abscess pus] continued to disclose amoebae until after the third course of emetine injections.

H. M. H.

LABBÉ (Marcel). Abcès du poudmon probablement amibiasique guéri par l'émetine. [*Abscess of Lung believed Amoebic cured by Emetine.*]—*Presse Méd.* 1930. July 23. Vol. 38. No. 59. pp. 993–994. With 4 text figs. [13 refs.]

The patient had suffered from acute and chronic dysentery acquired in Algiers. There was fever, copious mucopurulent expectoration and leuco-

cytosis of 17,000, and radiography revealed abscess in left upper lobe of lung. No amoebae could be found in sputa or in stools. After other remedies had failed, emetine injections were followed by disappearance of fever and purulent expectoration, and radiography showed resolution of lesion in left lung. The author notes that amoebae were not demonstrated; that many authors have reported cure of pulmonary abscess by emetine where no amoebae could be demonstrated nor an amoebic origin reasonably suspected; nevertheless he endorses the dictum that the touchstone of amoebiasis is emetine therapy.

H. M. H.

HOUSIAU. Troubles des faisceaux cerebelleux et du cervelet. Conséquence d'une ancienne dysenterie amibienne. Un cas de dysenterie datant de près de 10 ans. [**Cerebellar Symptoms attributed to Old Amoebic Dysentery.**—*Ann. Soc. Belge de Méd. Trop.* 1930. June 30. Vol. 10. No. 2. pp. 177-180.]

1. A woman after 9 years in the Congo developed marked signs of cerebellar lesions—severe vertigo, persistent headaches, continual vomiting, frequent falls always to the left. Eventually *E. histolytica* cysts were found in her faeces. Emetine injections were followed by very definite cessation of cerebellar symptoms. The author declares not for amoebic cerebellar abscess but for amoebic invasion of the brain by *E. histolytica*—this being “démontrée par l'efficacité du traitement par l'émétine”

2. A woman who had never been in tropics had suffered for over nine years from almost continuous muco-sanguineous diarrhoea. Active amoebae were found in her stools. She was cured of symptoms by emetine injections.

H. M. H.

KILBOURNE (E. D.). **Amoebic Abscess of the Liver—its Treatment.**—*California & Western Med.* 1930. Sept. Vol. 33. No. 3. pp. 658-661. [9 refs.]

The author states that although amoebic abscess of the liver is met much less frequently since the advent of emetine, it is not uncommon in the United States. Medical treatment by ipecacuanha, emetine, and other drugs prevents many abscesses, but it is insufficient after they have formed. Blind exploration and aspiration by needle are inefficient and dangerous. Laparotomy is necessary, whether the abscess be single or multiple, except when liver is adherent to abdominal wall thereby making needle puncture relatively safe; even then one must guess at what is happening in remainder of liver. Location of abscess or abscesses preliminary to evacuation should be made by intra-abdominal palpation by the whole hand. Many an abscess will thus be found that would be missed by simple puncture. An occasional patient saved is the reward of the extra operative work. The abscess cavity may be drained best by abdominal, subpleural, or transpleural routes after such accurate localization.

H. M. H.

ARAFA (M. A.). **Treatment of Dysentery.**—*Jl. Egyptian Med. Assoc.* 1930. May. Vol. 13. No. 5. pp. 168-197. [9 refs.]

This paper deals with treatment of amoebic dysentery by rivanol. The diagnosis of each case was based on results of careful microscopic examination of material from the gut—either in stool or obtained by

sigmoidoscope, and on sigmoidoscopy—which last was used also to watch results of treatment. The author concludes that yatren enemata combined with yatren pills orally produce rapid healing of amoebic ulcers, and render stools free from *E. histolytica*. The author has tried rivanol and yatren treatment combined in too few cases as yet to warrant expression of opinion as to its value. Rivanol given rectally is irritating to mucosa in 1:2,000 concentration, causing marked hyperaemia of rectal mucosa as viewed through sigmoidoscope. In 1:10,000 it has no lethal effect on *E. histolytica*. Rivanol given orally in doses as high as 0.075 gm. t.d. has not been found to produce any toxic effects on the patient, nor to have any marked lethal effect on *E. histolytica*. In only 3 very mild amoebic infections did *E. histolytica* disappear from stools; all other cases soon showed return of symptoms and *E. histolytica* in active vegetative form in stools either before or soon after completion of rivanol course. Rivanol did, however, procure marked relief from tenesmus, and blood and mucus soon disappeared—to return soon after stopping the drug. However, the antispasmodic and antiseptic action of rivanol may with advantage be utilized for relief of colic and tenesmus, and for assisting cleansing of bowel of superadded infection in various dysenteric conditions where lower bowel symptoms are a marked feature of the disease.

H. M. H.

CHOPRA (R. N.) & DE (N.). **A Failure of the Alkaloids of *Holarrhena antidysenterica* (Kurchi) in the Treatment of Amoebic Hepatitis.**—*Indian Med. Gaz.* 1930 July. Vol. 65. No. 7. pp. 391–392. With 1 chart in text. [School of Trop. Med. & Hyg., Calcutta.]

The patient had suffered from rigors, intermittent fever and profuse sweats. Spleen palpable. *P. falciparum* found in blood. Quinine therapy failed to abolish fever. Liver became enlarged and tender, and bulging appeared in lower intercostal spaces. Total leucocytes 20,000. Four daily intramuscular injections of total alkaloids of *Holarrhena antidysenterica* had no effect on fever or liver condition. After a second injection of emetine hydrochlor. grain 1, temperature fell to and remained normal; after 6 injections liver was normal to clinical examination. Total leucocytes 8,750. [It is regrettable that the amoebic nature of the hepatitis must be guessed only.]

H. M. H.

LEIBLY (Frank J.). **Fatal Emetin Poisoning, due to Cumulative Action, in Amoebic Dysentery.**—*Amer. Jl. Med. Sci.* 1930. June. Vol 179. No. 6. pp. 834–839. With 1 chart in text. [16 refs.]

A woman, 21 years old, weighing about 100 pounds (37 kg.), suffering from diarrhoea and abdominal cramps, *E. histolytica* present in stools, was given (in 0.02 gm. doses each injection) intravenously 0.56 gm. of emetine hydrochlor. during 21 days, and again after 10 days interval, a further total of 0.72 gm. in 29 days, but this time given intramuscularly, 0.065 gm. each dose. She thus received 1.28 gm. or 0.034 gm. per kg. of body weight over a period of 60 days. The injections were stopped because of patient's general debility. Six days later death occurred from vasomotor collapse and heart failure, "brought on by the cumulative action of emetin."

At autopsy entire large intestine was examined for ulcers—only one small one (0.66 cm. diameter) was found just lateral to opening of ileum into caecum. Several scars as from healed ulcers. Veins throughout dilated; heart to naked eye showed slight myocarditis [no report on histology of heart muscle]. By microscope liver showed parenchymatous degeneration

most marked about central veins. There was acute diffuse nephritis and acute parenchymatous degeneration of adrenals; acute hyperplasia of spleen. The emetine injections had failed to rid stools of pus and blood or of amoebae. The author records only "*Entamoeba histolytica*" and "amoebae present; few pus cells."

H. M. H.

HALAWANI (A.). **Experimental Study on the Resistance of *Entamoeba histolytica* to Emetine Hydrochloride in vitro.**—*Ann. Trop. Med. & Parasit.* 1930. July 8. Vol. 24. No. 2. pp. 273-288. [36 refs.] [School of Trop. Med., Liverpool.]

Full details are recorded of the author's experimental observations—they lead to the conclusion that :

"1. The resistance of *Entamoeba histolytica* to emetine hydrochloride can be raised by passing it systematically for a long period through graduated concentrations of that drug. 2. The amoeba undergoes a reduction in size after its passage over a long period through emetine hydrochloride. 3. The resistant amoeba retains its reproductive powers."

The author discusses the observations on resistant amoebiasis of various workers, and summarizes his most interesting and valuable research as follows :—

"The workers on this problem are, and will probably long remain divided in their theories as to the cause of resistant cases. The chief and most feasible of these theories advanced are :—

"1. An acquired resistance to emetine by *Entamoeba histolytica* after inefficient treatment. 2. Mechanical causes such as fibrosis around the diseased tissues preventing access of the drug via the blood. 3. Excystation of the resistant cysts in the bowels after cessation of treatment. 4. The hydrogen-ion-concentration plays a rôle in the efficacy of the drug. 5. Rapid excretion of the drug by the kidneys preventing it reaching the site of the lesion, as in the case of the cat. 6. A diminution of the curing properties of the drug during the cold weather is possibly associated with a change in the endocrine rate of metabolism leading to a loss of resistance on the part of the patient.

"Whatever may be the cause, or combination of causes of the occurrence of cases of amoebic dysentery resistant to emetine in spite of prolonged treatment, the results of my experiments lead me to conclude that one of the chief of these, is a tolerance to the drug gradually acquired by the amoebae. My culture of Mena Strain already showing some signs of resistance higher than the amoebae of the other three strains, was finally exalted through emetine tubes to a resistance four times that of untreated amoebae of the same strain, eight times that of the amoebae of V and G Strains, and five times that of the amoebae of Dobell and Laidlaw (1926). These results shed light on the interesting phenomenon of acquired drug tolerance already known to exist, to even a greater degree, among other parasitic members of the phylum protozoa."

H. M. H.

FAUST (Ernest Carroll). **Experimental Acute Amebic Colitis in Dogs.**—*Proc. Soc. Experim. Biol. & Med.* 1930. June. Vol. 27. No. 9. pp. 908-911. [9 refs.] [Dept. of Trop. Med., Tulane Univ., New Orleans.]

All evidence in the literature, as well as in the author's experience, preponderates in favour of belief that the amoeba in canine amoebic colitis is the same organism as *E. histolytica* of man. Since cysts are apparently not found in any type of the infection in dogs, the dog

is not likely to be a menace to man or to other dogs. The inference is, therefore, that the dog receives its infection from man. By injecting *per anum* into the distal ileum of the dog muco-sanguineous exudate from active amoebic colitis in dogs, the author produced infections corresponding to spontaneous dog-amoebiasis in 13 out of 14 dogs so injected—ranging in age from 2 months to 4 years. Incubation period as determined by presence of active *E. histolytica* in mucus withdrawn directly from caecum ranged from 1 to 23 days, with largest number on second day. Acute cases, probably complicated by bacteraemia, die in about 2 weeks. Chronic cases and one spontaneous recovery were noted. No instance of a cyst passer was observed. The caecum is the primary seat of infection in the dog.

H. M. H.

HIYEDA (Kentaro). **Pathological-Anatomical Studies on Experimental Amoebiasis in Kittens.**—*Amer. Jl. Hyg.* 1930. Sept. Vol. 12. No. 2. pp. 401–423. With 5 text figs. [25 refs.] [School of Hyg. & Public Health, Johns Hopkins Univ., Baltimore.]

" 1 Kittens were infected by rectal injections of *E. histolytica*.

" 2 When *E. histolytica* is present in the stool, besides the changes indicated by white yellowish dotted areas representing aggregations of leucocytes in the dilated capillaries and the production of mucus, small excavations can be seen in the surface of the colon. These small excavations are follicular ulcers.

" 3. After 24 hours in addition to the changes mentioned above a huge production of mucus and also of plasma occurs. *E. histolytica* are present in these masses, but have not yet entered the tissues.

" 4. The changes of the early period mentioned above are a sign of general colitis due to the presence of amoebae in the lumen of the intestine, but not in the tissue itself.

" 5. After 48 hours there are rough areas of different sizes in the mucous membrane. They consist of tissue debris, plasmatic exudates, mucus and amoebae. The upper layer of the epithelium in these rough areas is necrotic. The amoebae are found in the necrotic tissue and in the membrana propria, but they do not enter the deep part of Lieberkühn's glands.

" 6. Later on these necrotic areas enlarge, on the one hand spreading superficially, and on the other going down through the membrana propria. The deeper part of the mucous membrane is invaded and destroyed by the amoebae in the following way, the epithelium of Lieberkühn's glands is attacked from the basal side, not from the lumina, and there results the exfoliation of epithelium from their basal membrane. *E. histolytica* intrude thus into the formed space. As a result of the disappearance of the epithelium the amoebae multiply and form a characteristic amoebic mass closely packed together.

" 7. The pathological anatomical picture of amoebic colitis is quite characteristic. The following is a description, summarized and rather schematic. The amoebae in the intestinal tissue proceed approximately along the course of the connective or collagen fibres. In the superficial zone the amoebae have a tendency to spread parallel to the long axis of the intestine, because the fibres in this region run longitudinally. But it is clear that the superficial invasion cannot extend over a large area, as the supporting fibres run downward. From the superficial zone to the glandular part the amoebae move down within the membrana propria to the muscularis mucosa, since the fibres mostly run at right angles to the intestinal axis. In the deepest part of the membrana propria and in the submucosa the amoebae spread again parallel to the intestinal axis according to the course of the tissue.

" 8. These evidences are taken only from material from animals purposely killed. The material from animals which have been found dead after a certain period of infection sometimes suggests another mechanism, as for instance the invasion of Lieberkühn's glands by *E. histolytica* from the lumina of the intestine. My paper points out that these observations are not only made on insufficient material but are in contradiction to other biological facts known about *E. histolytica*.

" 9. The intestinal changes in the early period of colitis in experimental amoebiasis are not characteristic reactions due to the amoebae.

" 10. As to the probable exhaustion of the virulence of *E. histolytica* in the R.E.S. [Ringer-Egg-Serum] medium with starch, the present experiments are not sufficient in number to warrant a definite conclusion. The strain employed lost its virulence after three months and a half of cultivation, but was revived to a certain degree by retransference from the R.E.S. medium to the R.E.S. medium with starch."

On the question whether amoebiasis is a general disease or not, the author states that amoebae were found in the lymph and blood capillaries in the intestinal wall of his experimental kittens; but the amoebae do not remain alive in the regional organs, for he has never found any in the liver, lung, kidney and spleen of the experimental kittens. The only change he found in the mesenteric glands was a sinus-catarrh, which happens also in bacillary dysentery and in some other intestinal disorders. He has seen very few amoebae in the lymph sinuses even when these were much degenerated.

H. M. H.

MARTIN (Dale L.). **The Lesions in Experimental Amebic Dysentery.**—*Arch. Pathology*. 1930. Sept. & Oct. Vol. 10. Nos. 3 & 4. pp. 349-385; 531-579. With 24 text figs. [133 refs.]

These are careful and valuable observations very fully set out and well illustrated.

In regard to culture mediums the author concludes that :—

" The original medium of Boeck and Drbohlav is best for the cultivation of *Endameba histolytica*. The substitution of a sugar-free cover fluid for Locke's solution, as suggested by Drbohlav, and the addition of rice starch, as recommended by Dobell and Laidlaw, constitute the most valuable modifications of these basic mediums. Although the effect is not striking, the addition of acriflavine to the supernatant fluid portion of the medium for the first one or two transplants may help to establish the continuous growth of cultivated amebae."

For the rest the paper must be consulted. The work is on the same lines as that of HIYEDA (above).

H. M. H.

SIMIC (T.). La résistance des amibes pathogènes à l'action du froid, de la chaleur et de la lumière solaire. [**The Resistance of Pathogenic Amoebae to Cold, Heat and Sunlight.**]—*Ann. Parasit. Humaine et Comparée*. 1930. July 1. Vol. 8. No. 3/4. pp. 225-230. [5 refs.] [Hyg. Inst., Skoplje, Yugoslavia.]

The author's experiments demonstrate that the vegetative forms of *E. histolytica*, *coli*, and *gingivalis* are resistant to low temperatures—0° C., the vegetative form of *E. histolytica* much more so than that of *E. coli* and *E. gingivalis*; this biological character may be made use of in differential diagnosis between the first two amoebae. This resistance to cold increases directly with the number of passages in culture and most markedly

in the case of *E. histolytica*. *E. coli* and *E. histolytica* are sensitive to sun's rays, and degenerate much more quickly in the sun even at 22° C. than at 0° C. in the shade. The amoebae may be kept alive for a long time in stools by addition of Ringer's solution or normal saline solution. It is not cold but evaporation which kills the amoebae. Provided the stool be at once diluted with Ringer's, or with normal saline solution, diagnosis of *E. histolytica* can still be made, in the most unfavourable conditions, 8 to 10 hours after passage of stool.

H. M. H.

BEIJNEN (G. Koolemans). Over leveramoebiasis. [**Amoebiasis of the Liver.**].—*Nederl. Tijdschr. v. Geneesk.* 1930. Mar. 29. 74th Year. 1st Half. No. 13. pp. 1574–1583.

The article is a more or less verbatim transcription of a clinical lecture which enters very critically into the subject of differential diagnosis.

W. F. Harvey.

MACFADYEN (J. A.). **Clinical Observations on Amoebic Dysentery.**—*Jl. Med. Assoc. South Africa.* 1930. July 12. Vol. 4. No. 13. pp. 377–379.

The author states that in his private practice cases "proved to harbour the *E. histolytica*" were 4½ times more frequent than cases of bacillary dysentery [a complete reversal of the proportions for bacillary and amoebic dysentery actually proved everywhere else]. He does not state his proof except that "differential diagnosis is essentially microscopic."

H. M. H.

ABD-EL-AZIM (M.). **The Diagnosis of Amoebic Dysentery.**—*Jl. Egyptian Med. Assoc.* 1930 May. Vol. 13. No. 5. pp. 207–211. With 4 figs. on 1 plate. [4 refs.]

This is a brief recapitulation of the well-known points on which amoebic dysentery should be diagnosed by the cellular picture of the stool, the morphological characters of *E. histolytica*, and the sigmoidoscopic appearance of the gut mucosa

H. M. H.

BACILLARY DYSENTERY.

NELSON (Richard L.). **Sonne Dysentery. A Report of 32 Cases of Dysentery caused by *Eberthella paradysenteriae* Sonne.**—*Jl. Bacteriology.* 1930. Sept. Vol. 20. No. 3. pp. 183–201. [20 refs.] [Children's & Infants' Hosp., & Pediat. Dept., Harvard Med. School, Boston.] [Summary (with 2 tables not here reproduced) appears also in *Bulletin of Hygiene.*]

The author has encountered 32 cases of bacillary dysentery due to infection with the Sonne bacillus, 29 in children and infants, 3 in adults. Of these, 5 have been severe, the remainder mild. He gives six case histories, illustrating the milder and more serious forms of infection. He notes that the great majority of cases are not severe enough to cause any great concern, the illness being characterized by a short febrile attack, lasting from 24 to 48 hours, associated with diarrhoea setting in 24 to 48 hours after the onset of the fever and lasting from 2 to 6 days; mucus is common in the stools, blood is rare. Vomiting seldom occurs in these milder cases. A proportion of the cases are, however, of an altogether severer type, with frequent vomiting and

marked prostration. One such case in the present series was fatal. One case of the milder type was also fatal, but this occurred in a patient with uncompensated heart disease, and the dysenteric infection was probably only a contributory factor.

The biochemical and serological reactions of 28 strains of the Sonne bacillus isolated from these cases have been studied in some detail. The reactions of these strains have been compared with those of the *dispar* type described by ANDREWES, and of the metadysentery bacillus described by CASTELLANI. The results are set out in tables.

The author concludes that the metadysentery bacillus described by CASTELLANI is identical with Sonne's dysentery bacillus, while the *dispar* bacillus described by ANDREWES is an entirely different species.

W. W. C. Topley.

POWELL (A. T. W.). **Two apparently Unrelated Outbreaks of Bacillary Dysentery.**—*Brit. Med. Jl.* 1930. Aug. 2. pp. 173-175. [14 refs.]

The endemicity of dysentery in the British Isles is now fairly well established. Universal prevalence of the disease in late years appears only to be the consequence of recognition of this fact and more careful investigation of diarrhoeas. The outbreaks reported carefully in this article, together with the bacteriological and serological findings, have a special interest owing to the fact that they were produced by two different dysentery organisms, one of Flexner and the other of Sonne type. The Flexner outbreak provided the larger number of cases. In it the infection "bred true" throughout; it resulted in two deaths and two relapses, and no source of infection either through water or milk supply could be discovered. A detailed enquiry gave no ground for the belief that there was any connexion between the Sonne outbreak and the Flexner although the common shallow well water supply of two of the families involved showed gross contamination.

W. F. Harvey.

RIDING (D.). **Acute Bacillary Dysentery in Khartoum Province, Sudan, with Special Reference to Bacteriophage Treatment: Bacteriological Investigation.**—*Jl. Hygiene.* 1930. Aug. Vol. 30. No. 3. pp. 387-401. With 4 charts. [1 ref.] [Wellcome Trop. Research Labs., Khartoum.]

Sixty cases of bacillary dysentery were observed during the 2 years of investigation and the causal bacilli were confirmed serologically in 43 of these—as Shiga, Flexner, or Flexner-Y organisms. After bacteriological identification the organism isolated was subjected to the action of bacteriophage *in vitro*. An organism which showed clearing of the broth suspension at the end of 24 hours and sterile agar subculture was described as readily bacteriophagable, one which showed incomplete clearing but formation of "plaques" in agar subcultures as bacteriophagable and one which showed neither of these characters as not bacteriophagable with the standard bacteriophage. Of the 60 bacilli isolated, only 12 failed to show evidence of bacteriophagy and only 2 out of the 43 strains which had been confirmed serologically. For treatment some of the cases were set apart as controls but, in order to avoid bias, the author was not aware of the type of treatment adopted until the investigation was complete. The administration of the

bacteriophage was entirely by the mouth. "There were no fatal cases in the series and no dramatic results due to the bacteriophage treatment were demonstrated." Factors which might possibly influence bacteriophagy *in vivo* were investigated. The author concludes that bacteriophage is probably quickly eliminated or destroyed and that the clinical course of acute bacillary dysentery is not altered by the oral administration of bacteriophage.

W. F. Harvey.

BURNET (F. M.), MCKIE (Margot) & WOOD (I. J.). **Investigations on Bacillary Dysentery in Infants, with Special Reference to Bacteriophage Phenomena.**—*Med. Jl. Australia*. 1930. July 19. 17th Year. Vol. 2. No. 3. pp. 71–78. With 1 text fig. [3 refs.] [Walter & Eliza Hall Inst. & Children's Hosp., Melbourne.]

A series of 21 cases of dysentery was investigated in infants of ages ranging from 3 to 22 months. Both the organisms and the phages obtained from these cases were classified. The most important of the phages ("N type") was a highly active one which did not readily provoke resistant variants and the appearance of this phage was found generally to be of favourable import for the patient. While it was evident that the effect of the presence or absence of the phage on the disease was negligible in the case of children over one year it seemed possible that the higher mortality in younger infants was correlated with absence of active phage in the faeces. Other investigations dealt with the relation of antigenic structure and the phage reactions of dysentery bacilli, change of type of infecting organism during the disease and a suggested method of typing dysentery strains by the use of a series of phages.

W. F. Harvey.

TAYLOR (J.), GREVAL (S. D. S.) & THANT (U.). **Bacteriophage in Bacillary Dysentery and Cholera.**—*Indian Jl. Med. Res.* 1930. July. Vol. 18. No. 1. pp. 117–136. [1 ref.]

Special care was taken to obtain suitable cases for effective treatment and this explains how it was that out of 878 dysentery cases in 1929 only 24 conformed to requirements. These requirements were, short duration of illness, characteristic cellular exudate and isolation of the causative organism. The object of the work was to determine what was the natural incidence of phage and what treatment with phage could effect in acute cases before severe ulceration and necrosis had taken place. All the cases, both treated and controls, received ordinary saline treatment and in no case was anti-dysentery serum administered. There were 20 controls to 26 cases of bacillary dysentery and the phage used was active to a dilution of 10^{-10} . The dose given was 2 cc. orally three times a day. The result was, in the words of the authors, that "In spite of the presence of phage of higher activity in the stools of treated cases as compared with controls no significant difference was observed in the progress of cases either in regard to effect on mortality or in shortening the period of the attack. A detailed examination of cases showed no relation between the incidence of phage either naturally developed or following therapeutic administration and the progress of the cases."

Much the same type of result was obtained with cholera cases, 19 of which were used as controls and 14 treated with bacteriophage of high activity. The mortalities were 53 per cent. for controls and 57 per cent. for cases treated with phage.

W. F. Harvey.

LONDON (J.). **Bacteriophage in its Clinical Aspect.**—*Indian Med. Gaz.* 1930. July. Vol. 65. No. 7. pp. 370–371. With 1 chart in text. [2 refs.]

The author describes the results obtained from oral administration of bacteriophage in bacillary dysentery. Of 141 cases treated, 129 were cured and 12 died. In this total, 108 received no other treatment than bacteriophage and were discharged cured. The remainder did not respond so well.

W. F. Harvey.

VIOLLE (H.). De la pathogénie de la dysenterie bacillaire. [**Pathogeny of Bacillary Dysentery.**]—*Bull. Acad. Méd.* 1930. July 8. Year 94. 3rd Ser. Vol. 104. No. 27. pp. 59–62. [6 refs.]

The author briefly reviews in a general statement the results of his experiments on the immunization of rabbits against Shiga dysentery bacillus. Live Shiga bacilli introduced by the subcutaneous, intramuscular, intravenous, or oral route into the rabbit always select the small intestine; they settle and multiply there. The immunizing dose of living Shiga bacillus directly introduced into the small intestine is too near the lethal dose to provide an effective means of immunization. A dose of living Shiga bacilli injected (after laparotomy) through the external wall of the rabbit's small intestine into the intestinal submucosa procured perfect immunity from doses of living Shiga bacilli which proved lethal to control animals, and this immunity held whether the lethal dose was introduced intravenously or directly into intestine. The immunized rabbit's serum, however, showed *in vitro* neither specific agglutinins nor fixation of complement. The dose of living Shiga bacillus, which was non-lethal but immunizing when injected into the submucosa of the small intestine of the rabbit, was lethal to the rabbit if injected intravenously. Experimental observations showed that intestinal mucosa *in vitro* has the power of neutralizing products of Shiga bacillus and *in vivo* experiments appeared to confirm this. In the normal person the syndrome of dysentery would not appear; there must be exceptional conditions for it to develop.

H. M. H.

ALIVISATOS (G. P.). Die perorale Immunisierung gegen Ruhr. [**Peroral Immunization against Dysentery.**]—*Immunität, Allergie u. Infektionskr.* Munich. 1929–30. Vol. 2. No. 1/2. pp. 37–52.

A careful account is given at considerable length of the basis and advantages of peroral immunization against dysentery. The author's own statistics showed an incidence of 3 cases (0·8 per cent.) among 373 treated and 96 cases (23·2 per cent.) among the 417 control untreated persons. Much larger doses than the usual total of 0·15 gm. were given. They were 0·2 to 0·24 gm. (total) of Shiga-Kruse bacilli, killed at 55° C.

and formolized at 0.15 per cent., on 5 to 6 days, often with an interval of 5 to 6 days between the 3rd and 4th doses. These amounts were well borne by adults but should be reduced to half for children under 12 years of age. It is necessary to realize that no cross immunity is obtainable between Shiga-Kruse and paradysentery bacillary infections. Accordingly, the organism concerned in an epidemic must be that which is used in immunization. Immunization will last for at least a dysentery season.

W. F. Harvey.

CHASKINA-MUNDER (G.). Dysenteriebacillen im Vaginalsekret junger Mädchen.—*Ztschr. f. Kinderheilk.* 1929. Vol. 48. pp. 690-693. [6 refs.]

—, [Dysentery Bacilli in the Vaginal Secretion of Girls.]—*Trop. Med. & Veterin.* Moscow. 1930. Vol. 8. No. 2. pp. 47-49. [6 refs.] [In Russian.]

The author examined 24 girls with symptoms of non-specific vulvovaginitis. From the vagina of two of these Flexner's bacilli were isolated. Their nature was confirmed both by cultural and serological reactions and by inoculation of rabbits. In one case the blood showed the agglutination reaction. It is concluded that the condition in both cases was due to the micro-organism in question. The examination of the faeces of these children was negative, nor were dysenteric symptoms present.

C. A. Hoare.

BEZEMER (F.). *Bacterium dysenteriae* Shiga-Kruse in het bloed tijdens het leven. [*Bacterium dysenteriae* Shiga-Kruse in the Blood during Life-time.]—*Geneesk. Tijdschr. v. Nederl.-Indië* 1930. June 1. Vol. 70. No. 6. pp. 551-556. [22 refs.]

From a bile culture of blood of a European patient of 39, as well as from his faeces, the Shiga-Kruse bacillus was isolated. The agglutination titre of the patient's serum against the strain was 1 : 100, that against pseudo-dysentery bacillus 1 : 200. The patient recovered.

Some quotations from the literature serve to show the rarity of this finding.

W. J. Bais.

CERRUTI (Carlo F.). The Metadysentery Bacilli (Castellani).—*Jl. Trop. Med. & Hyg.* 1930. July 15 Vol. 33. No. 14. pp. 207-210. [29 refs.] [Royal Inst. of Hyg., Univ., Turin.]

The author considers that the classification of dysentery bacilli devised by CASTELLANI is practical and scientific. He discusses the generic position of the metadysentery bacilli and gives the principal species with their reactions.

W. F. Harvey.

STETTNER (Ernst). Ueber die Behandlung der Bazillenruhr im Kindesalter. [Treatment of Bacillary Dysentery in Children.]—*Immunität. Allergie u. Infektionskr.* Munich. 1928-29. Vol. 1. pp. 367-377. [11 refs.] [Univ. Children's Clinic, Erlangen.]

In a discursive statement of his own experience the author stresses the importance of dietary treatment, in which fluids must be liberally supplied.

Among drugs he claims yatren, by mouth and in clysmas, as giving the best results.

H. M. H.

NAKAJIMA (Gishiro). **On Cystin Reduction by Dysentery Group.**—*Denshō Gakkaishi (Jl. Infect. Dis. Soc.)*. 1929. Aug. Vol. 3. No. 11. [Summarized in *Japan Med. World*. 1930. Jan. 15. Vol. 10. No. 1. pp. 16–17.]

The Sonne strain of dysentery is differentiated from other members of the dysentery group by its reduction of cystin in an oryzanin non-protein medium with production of hydrogen sulphide. In this it resembles typhoid, paratyphoid and coli organisms.

W. F. Harvey.

MIXED AND UNCLASSIFIED DYSENTERY.

DUNBAR (L.) & STEPHENS (E. D.). **Notes on the Dysenteries of the Madras District.**—*Indian Jl. Med. Res.* 1930. July. Vol. 18. No. 1. pp. 149–163. With 1 chart in text. [5 refs.]

Amoebic dysentery has long been regarded as the chief dysentery in the Madras district. In actual fact bacillary outnumbers amoebic dysentery by about five to one. The commonest causal organism is a bacillus of Flexner type. The bacillary dysentery as seen by the authors was mild but present all the year round. Healthy carriers are rare—0·34 per cent. Indian carriers of *E. histolytica* cysts are common, at least 21·9 per cent., and the British soldier carries *E. histolytica* cysts at approximately the same rate; it is conceivable that the *E. histolytica* of this district is non-pathogenic. It is equally conceivable that amoebic dysentery is always secondary to bacillary.

H. M. H.

PERRY (H. Martian). **Observations on Dysenteric Infections in Egypt.**—*Jl. Egyptian Med. Assoc.* 1930. Apr. Vol. 13. No. 4. pp. 93–105.

Both in adults and in children 75 per cent. of the cases are bacillary, and 15 per cent. amoebic: 50 per cent. of bacillary cases are due to one or other Flexner bacilli; the more severe type, the Shiga bacillus infection, accounts for 10 per cent., and the Sonne bacillus is causative agent in 15 per cent. In a small number of cases an acute Flexner group bacillus infection was found superimposed on *E. histolytica* infection.

The above results are based on examination of over 800 cases of acute dysentery and can be accepted as accurate classification of the type of disease prevalent in Egypt.

A provisional diagnosis of the type of dysentery can be made on the character of the cellular exudate.

H. M. H.

SHAWKI (I.). **Dysenteries in Children in Egypt.**—*C. R. Congrès Internat. de Méd. Trop. et d'Hyg. Le Caire, Egypte, Décembre, 1928*. Vol. 2. pp. 929–934. [12 refs.]

The author reports on 98 cases of dysentery in children 6 months to 8 years old in which there had been thorough microscopical and cultural

investigation of stools, the bacteria isolated being further tested against known immune sera. Amoebae or lamblia were found in 12 per cent. Of 76 per cent. in which bacteria were isolated Flexner or Y bacillus were found in 52 per cent. ; Shiga in 23.5 ; and Morgan No. 1 bacillus in 20 per cent. No pathogenic agent in 12 per cent.

H. M. H.

BIGGAM (A. G.). **The Sigmoidoscope as an Aid in the Diagnosis of Dysenteric Conditions in Egypt.**—*Jl. Egyptian Med. Assoc.* 1930. May. Vol. 13. No. 5. pp. 149–167.

——. **The Diagnosis of Dysenteries.**—*Jl. Roy. Army Med. Corps.* 1930. July. Vol. 55. No. 1. pp. 16–24.

—— & ARAFA (M. A.). **The Sigmoidoscope as an Aid in the Diagnosis of Dysenteric Conditions in Egypt.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1930. Aug. 8. Vol. 24. No. 2. pp. 187–200. With 12 coloured figs. on 3 plates.

The author has found preliminary dieting and lavage to clear the bowel of faecal material better than attempts at cleansing by lavage and general swabbing through the sigmoidoscope. The instrument is passed for three inches, obturator removed, and further passage carried out under direct vision aided by gentle air inflation. Even in extensively ulcerated guts this gentle air inflation has caused no pain nor been harmful. Mucus can be removed by swabbing so as to get clear view of submucosa and determine if ulcers, as they often do, underlie patches of slimy mucus. The magnifying glass fitted to instrument is necessary for finding the smallest ulcers.

Amoebic, bacillary and bilharzial dysentery are then considered in turn ; the appearances are carefully described and illustrated by good coloured plates (Biggam & Arafa).

H. M. H.

SMYLY (H. Jocelyn). **The Diagnosis and Treatment of Chronic Dysentery.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1930. June 30. Vol. 24. No. 1. pp. 39–66. With 12 coloured figs. on 1 plate. [17 refs.] [Peiping Union Med. College, Peking.]

A full and instructive record, well illustrated, of careful observations in Peking, of great clinical value. They emphasize the importance for accurate diagnosis of sigmoidoscopy. They show that a higher number of positive results is given if culture be made at once of swabs or scrapings of colon ulcers obtained directly through sigmoidoscope, and that it is misleading to diagnose merely on microscopic findings in material obtained by swabbing or scraping of gut, for in some cases positive cultures of *Bacterium dysenteriae* were obtained from curette-material which also showed microscopically many motile *E. histolytica* ; and in several other cases *E. histolytica* cysts were found in the stools, where the colon ulcers failed to give amoebae, but gave positive cultures of *Bact. dysenteriae*. In Peking where 30 per cent. (KESSEL and SVENSSON 1924) of community are *E. histolytica* carriers it was to be expected that a large number of bacillary dysentery patients would be *E. histolytica* carriers. The author's observations form important additional evidence in support of the contention that " chronic ulcerative colitis " is " chronic bacillary dysentery."

Fifty-six Cases of Bacillary Dysentery showing Duration of Disease when Positive Cultures were obtained.

Organism.*	Months.												Totals, 1 to 12 months.	Years.							Totals over 1 year.
	1	2	3	4	5	6	7	8	9	10	11	12		1	2	3	4	5	6	10	
M.F. ...	1	1	1	2		1		1	1	2	1	1	12	5	2	1	3	2			13
S. ...		2	1			2		1					6	3	3	3				1	10
M.F. + S. ...				1	1	1	1						4	1				1			2
M.F. + E.h.		1	1	1		1		1					5								
S. + E.h. ...						1	1						2								
M.F. + S. + E.h. ...															1				1		2
Totals ...	1	4	3	4	1	6	2	3	1	2	1	1	29	9	6	4	3	3	1	1	27

* M.F. = *Bact. dysenteriae*, Mannite-fermenting group.

S. = *Bact. dysenteriae*, Shiga type.

E.h. = *Entamoeba histolytica*.

H. M. H.

WALKER (J.). Quelques observations bactériologiques et épidémiologiques au sujet des dysenteries et entérites du Katanga. [**Dysentery and Enteritis in Katanga : Bacteriology and Epidemiology.**]—*Ann. Soc. Belge de Méd. Trop.* 1930. June 30. Vol. 10. No. 2. pp. 181-212.

The author's observations lead him to conclude :—

1. The dysenteries and dysenteric enteritis of the Katanga are divisible for the most part into two categories—bacillary dysenteries and alimentary intoxications.

2. Most of the bacillary dysentery was caused by a Shiga bacterium, or by other bacteria belonging to the genus *Shigella* (Castellani and Chalmers). In some cases organisms of the genus *Lankoides* were isolated.

3. The alimentary intoxications were due to *Proteus* bacillus, *Enteroides* and *Balkanella* (group *Eberth-Aerogenes* of Castellani and Chalmers), and occasionally probably to other saprophytes such as the *Faecalis alcaligenes* bacillus, *Pyocyaneus*, or perhaps even to toxic strains of the colon bacillus.

4. In a minority of cases were found organisms of the *Salmonella* (Aertryck) group, Morgan's bacillus, and Castellani's Asiaticus group. Certain serological reactions indicated that these organisms were present oftener than could be established by the stool examinations.

5. Bacillary dysentery prevails in the cold season in epidemic outbreaks, always shows the classical features of dysentery, is mild and yields readily to proper treatment. Mortality 13 per cent., but the fatal cases were complicated by other affections.

6. The alimentary intoxications prevail in the hot season among the poor and ill-nourished natives; are not epidemic; often conjoined with or succeeding some other bacillary or parasitic infection. Polymorphic clinical features; difficult to treat; mortality 20 per cent.

7. The dysentery bacilli isolated were in general agglutinated by an anti-Shiga serum and by the patients' own serum. The organisms of the

alimentary intoxications rarely formed agglutinins; sometimes specific agglutination appeared in the course of the illness. Agglutination of colon bacillus by the patients' serum was frequent.

H. M. H.

MENON (T. Bhaskara). **The Pathology of Chronic Colitis in the Tropics.**—*Indian Jl. Med. Res.* 1930. July. Vol. 18. No. 1. pp. 137–141. With 7 coloured figs. on 5 plates. [6 refs.] [Med. College, Madras.]

In a valuable paper, well illustrated, the author describes the different types of dysenteric lesions observed in 800 autopsies. Histologically "stercoral" ulcers are indistinguishable from chronic dysenteric ulcers; 60 per cent. of fatal cases of "chronic" colitis or "chronic diarrhoea" of indefinite origin show morphologically strong resemblance to the lesions of chronic dysentery; some cases showed an atrophied state of all the coats of the large and small intestine, the exact cause of which was not determined.

H. M. H.

CHOPRA (R. N.). ***Plantago ovata*—Ispaghul—in Chronic Diarrhoeas and Dysenteries.**—*Indian Med. Gaz.* 1930. Aug. Vol. 65. No. 8. pp. 428–433. [4 refs.] [School of Trop. Med. & Hyg., Calcutta.]

In the last 15 years the author has given very extensive clinical trials to the seeds of *Plantago ovata*, the chemical composition, pharmacological action, and therapeutic uses of which are described in this paper. The author has used it in: (1) chronic bacillary dysentery; (2) chronic amoebic dysentery; (3) chronic constipation, with auto-intoxication due to other causes; (4) "Hill diarrhoea"; (5) chronic diarrhoea in children. In all these conditions he claims the seeds of *P. ovata* to be very beneficial. A glucoside, *Aucubin*, has been found in the seeds, but is physiologically inactive. The tannins present in appreciable quantities have little action on entamoeba or bacterium. Action of *P. ovata* is therefore mechanical; due to the large amount of mucilage in superficial layers of the seeds. This mucilage is shown not to be acted on by the digestive enzymes, and therefore passes unchanged through the small intestine; it lines the mucosa of the gut and as demulcent is protective and sedative. In the large gut the bacteria have been shown to have little or no action on the mucilage—practically the whole of it is passed out unchanged 12 to 24 hours after administration. It coats the inflamed ulcerated mucosa and protects it from irritation of fluids and gases. This enables the lesions to heal quickly. Toxins in gut are adsorbed by the gel and their absorption into the system prevented. The seeds are taken in large quantities, and as they swell up in contact with water they increase the bulk of gut contents and thus relieve constipation by mechanically stimulating gut peristalsis.

H. M. H.

GHEORGHIU (I.). Contribution à l'étude d'une épidémie de gastro-entérite dysentérique. [**Study of an Epidemic of Dysenteriform Gastro-Enteritis.**]—*Ann. Inst. Pasteur.* 1930. June. Vol. 44. No. 6. pp. 711–718. With 2 text figs. [2 refs.] [Bact. Lab., Faculty of Med., Jassy.]

Entirely inconclusive observations on 186 cases, for no pathogenic agent was demonstrated by culture or serological tests.

H. M. H.

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- GESSNER (Otto). Schlussbemerkung zu der Erwiderung von O. Schaumann auf meine Bemerkung in diesem Archiv, Bd.33, S.277 ff.—*Arch. f. Schiffs- u. Trop.-Hyg.* 1929. Sept. Vol. 33. No. 9. p. 492. [1 ref.]
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YELLOW FEVER.

JORGE (Ricardo). La fièvre jaune et son extinction à Rio de Janeiro. [**Yellow Fever and its Extinction at Rio de Janeiro.**—*Bull. Office Internat. d' Hyg. Publique.* 1930. Aug. Vol. 22. No. 8. pp. 1481-1493. With 2 text figs. [8 refs.]]

An interesting and instructive summary of certain aspects of the epidemiology of yellow fever with special reference to the Rio epidemic which came to an end in July 1929. With regard to the incidence of the disease 80 per cent. of the cases occurred in persons more than 15 years old, and 76 per cent. were males. Ninety-two per cent. were whites, 64 per cent. foreigners, and 60 per cent. of the patients had less than 5 years' residence. The fatality of various groups of the population varied between 55 and 67 per cent., with a mean of 59.6, except in the case of negroes; there were only 6 cases with 1 death in this group, and although these figures are very small, there is additional evidence that the negroes are relatively resistant. An examination of the statistics shows that in the case of mulattos, who numbered only 7 per cent. of the total number of cases, the fatality was 67 per cent. as compared with 66 per cent. among whites. It is not easy to explain the relative immunity of mulattos to this infection, for it is evident that once having become infected the disease is quite as fatal to them. The supposed resistance of negroes requires further investigation. Attention is called to the importance of non-apparent cases in which the nature of the disease cannot be detected by clinical examination and in West Africa the work of the Rockefeller Commission (see below, p. 283) has shown the existence of endemic areas of yellow fever even in regions where cases of the disease have not been observed.

The author then discusses the possible significance of monkeys as a reservoir of the virus and the results of recent infection experiments with various species, and concludes with reference to work on the nature of the virus and on yellow fever vaccine. As the author aptly remarks, "with an efficient vaccine yellow fever prophylaxis will be completely armed."

E. Hindle.

PEÑA CHAVARRIA (Antonio), SERPA (Roberto) & BEVIER (George). **Yellow Fever in Colombia with Special Reference to the Epidemic in Socorro in 1929.**—*Jl. Preventive Med.* 1930. Nov. Vol. 4. No. 6. pp. 417-457. With 5 text figs. [44 refs.]

A general historical account of yellow fever epidemics in Colombia since the first known outbreak in 1509. It is stated that the disease probably did not occur in the interior until about 1830, when it extended up the Magdalena River and from Maracaibo up to the Catatumba Zulía Valley. Since 1900 Santander seems to have been the centre of infection with severe epidemics in 1910, 1923 and 1929. During January and February, 1929, an epidemic, locally supposed to have been influenza, occurred in Guadalupe, Santander; possibly some of these cases were yellow fever. From April to July, 1929, in the neighbouring town of Socorro, there were 150 cases of yellow fever with 34 deaths. Antimosquito measures soon brought the epidemic under control, but it is curious that the disease apparently did not extend to other towns, in some of which *Aedes aegypti* was more common than in Socorro. Clinically there were two forms of the disease:—

"One was mild or abortive, beginning suddenly with a chill, severe and persistent pain in the back, headache, pains in muscles and joints, vomiting, fever, bloated face, injected conjunctivae and mucous membranes, an increased pulse rate, frequently a mild icterus, scanty and albuminous urine, and a sudden reaction for the better at the end of 24 to 36 hours, followed by convalescence. The other form began in much the same way, perhaps with more marked symptoms, accompanied by restlessness and a sense of anxiety. A slight remission, corresponding to the onset of convalescence in the mild type, was followed by a prompt return of the temperature to 38° or 39° C., slow pulse rate, increased icterus, and decided hemorrhagic tendencies such as bleeding gums, epistaxis, melena, black vomit, and even purpuric infiltrations of the skin. The urine, which was scanty or suppressed entirely, contained great quantities of albumin. Shortly after death the cadaver took on a characteristic yellow color."

The pathological and histological findings were typical and monkeys inoculated with the serum of recovered cases were protected against a subsequent injection of yellow fever virus. Many positive results were also obtained with the sera of patients who had suffered from yellow fever in Bucaramanga in 1910 and 1923, and in Guadalupe in 1929. The Santander region where these two towns and also Socorro are situated is so isolated by high mountains that the introduction of infected persons or mosquitoes is considered very unlikely. The recent epidemics suggest that the disease may be endemic in this region, maintained by mild unrecognized cases. E. H.

GAITAN (Luis). La fièvre jaune au Guatemala. [**Yellow Fever in Guatemala.**]—*Bol. Sanit. de Guatemala*. 1929. Oct.-Dec. Vol. 1. No. 2. p. 65. [Summarized in *Bull. Office Internat. d'Hyg. Publique*. 1930. Dec. Vol. 22. No. 12. p. 2308.]

The author considers that the disease is endemic along the sea coast of Caraiiba and that there is a constant danger of epidemics, especially in view of the large number of *Aedes* in the coastal region of the Republic. This century epidemics have occurred in 1903, in 1918, when there were 609 cases with a mortality of 42 per cent., and in 1920 and 1921 on the borders of Honduras; since then no cases seem to have been recorded. E. H.

LUTZ (Adolpho). [In Portuguese & German.] Reminiscencias da febre amarela no Estado de São Paulo. Erinnerungen aus der Gelbfieberzeit im Staate São Paulo. [**Reminiscences of Yellow Fever in São Paulo.**]—*Mem. Inst. Oswaldo Cruz*. 1930. Oct. Vol. 24. No. 3. In Portuguese pp. 127-142. In German pp. 143-160.

A very interesting account of the author's long personal experiences of this disease extending back to the eighties of last century. Many aspects of yellow fever are referred to and the paper should be read in its entirety by all those interested in the subject. E. H.

LAMY (P.). L'épidémie de fièvre jaune et de peste en 1899 à la Côte d'Ivoire. [**The Epidemic of Yellow Fever and Plague in 1899 on the Ivory Coast.**]—*Bull. Soc. Path. Exot.* 1930. Nov. 12. Vol. 23. No. 9. pp. 891-898.

A dramatic account of an epidemic of yellow fever during April and May, 1899, at Bassam on the Ivory Coast. The author's two medical

colleagues died of yellow fever, and the 33 resident white population all became infected and 30 died of this disease during these two months. The author remarks that after considerable experience at the Front during the Great War, including many important engagements, he has never experienced such a feeling of hopeless terror, approaching panic, as during his residence at Bassam, for at that time the method of infection was unknown. Eventually the author himself became infected; he describes his symptoms with graphic details, and the anxious interest with which he followed the amount of albumin in his urine.

The author submitted an official report of this epidemic, which was evidently suppressed as there was no mention of it in any of the medical journals of the time. Moreover, on returning to Paris, he made a verbal report as to the nature of the infection, but the administrative authorities refused to admit the existence of yellow fever in that region since it would have interfered with commerce and discouraged future colonists.

E. H.

BEEUWKES (Henry), BAUER (J. H.) & MAHAFFY (A. F.). **Yellow Fever Endemicity in West Africa, with Special Reference to Protection Tests.**—*Amer. Jl. Trop. Med.* 1930. Sept. Vol. 10. No. 5. pp. 305-333. With 2 maps in text. [4 refs.] [West African Yellow Fever Commission, Internat. Health Division, Rockefeller Foundation, Lagos.]

A most important article on the epidemiology of yellow fever in West Africa. After an interesting discussion of the various regions of West Africa, the authors bring evidence to show that a densely populated area in Southwestern Nigeria, including Ibadan and many other large towns, is a definite endemic centre of the disease.

It is well known that the blood of persons who have recovered from yellow fever will protect rhesus monkeys against the infection and particulars are given of 3 cases in which the serum protected monkeys after intervals of 24 to 27 years since the attack of the disease. Consequently, protection tests were carried out with the sera of natives taken at random in several towns.

As a routine method 5 cc. of serum was injected intraperitoneally into each monkey, and the virus was usually inoculated 3 to 24 hours later. Two monkeys were used for each experiment since these animals sometimes die from intercurrent infections and occasionally are refractory.

The results of protection tests with the sera of natives from various West African towns is summarized in the following table.

It will be noticed that among 125 sera collected at random from persons living in Ibadan and Ilorin, in the region considered endemic, 30.4 per cent. protected duplicate monkeys, and in Ife, where an epidemic had recently occurred, 17 out of 25 sera, or 68 per cent., protected two animals. In contrast with these results, in Northern Nigeria out of 90 examined only one person was found to be positive. Twenty-four per cent. of the sera of children between the ages of 4 and 5 years taken at random in Ibadan, and a similar percentage of sera from children at Ilorin between 4 and 7 years, protected duplicate monkeys. It seems, therefore, that at least one of every four young children in these cities has had an attack of yellow fever. Moreover, the authors bring forward strong evidence in support of the view that the actual number of children who have had the disease is probably greater than these figures suggest.

Towns.	Total No. of specimens tested.	No. of sera which protected both monkeys.	No. of sera which showed no protection.	No. of sera with which only one mon- key died.
1. Southwestern Nigeria :				
Ibadan	100	32	50	18
Ilorin	25	6	10	9
Total	125	38	60	27
2. Northern Nigeria :				
Bauchi	36	0	35	1
Zaria	29	0	27	2
Kano	25	1	21	3
Total	90	1	83	6
3. Ife, after an epidemic of yellow fever ...	25	17	6	2
4. Freetown. No yellow fever reported since 1910	34	1	30	3

During the extensive epidemics studied on the Gold Coast, a few babes-in-arms with scleral icterus were observed, but no child under 5 years presented a clinical picture justifying the diagnosis of yellow fever.

With regard to the experimental details it was found that not more than 6 per cent. of normal rhesus monkeys survived the injection of 0.1 cc. of virulent blood taken at the onset of fever. Dilution experiments, using 10 to 25 per cent. normal serum as a diluent, have shown that amounts of between 0.0000001 and 0.000000001 cc. of infected blood have frequently proved fatal, and in these protection tests the amount of blood used represented approximately 1,000,000 lethal doses.

The amount of immune serum is of importance, but 1 to 2 cc. were repeatedly found to protect against large doses of virus, although on one occasion 2 cc. of this same immune serum when tested in duplicate monkeys protected one and not the other.

[It is unnecessary to draw attention to the great importance of these observations on the prevalence of yellow fever in the various regions selected by the authors. The results in Ibadan and Ilorin show that this region is a great endemic centre of the disease, and support the view advanced by Sir Rubert BOYCE 20 years previously, that the West African native is as saturated with yellow fever as he is with malaria.]

E. H.

HUDSON (N. Paul) & KITCHEN (S. F.). **Postepidemic Diagnosis of Yellow Fever by the Passive Immunity Test.**—*Jl. Preventive Med.* 1930. Nov. Vol. 4. No. 6. pp. 459-462. [10 refs.] [Yellow Fever Lab., Internat. Health Division, Rockefeller Foundation, New York City.]

This paper contains details of the passive immunity tests made with the blood of 13 recovered cases of suspected yellow fever from Bucara-

manga, Guadalupe, and Socorro. Two of the Guadalupe cases and one Bucaramanga case were negative, but all the others were positive. A West African strain of virus (Asibi) was used in these experiments, which therefore show that yellow fever in Colombia is immunologically identical with the disease in West Africa.

E. H.

HINDLE (Edward). **The Transmission of Yellow Fever.**—*Lancet*. 1930. Oct. 18. pp. 835–842. [21 refs.] [Wellcome Bureau of Scientific Research, London.]

This paper contains records of numerous experiments on the transmission of yellow fever carried out during the past two and a half years at the Wellcome Bureau of Scientific Research. Four strains of virus were used, three African and one Brazilian, but no marked difference could be found between them. Vaccination or other methods of immunization against one strain also protected against all other strains and these results support the now generally accepted view as to the identity of the African and American strains.

Direct transmission. The course of infection in man and monkeys is next considered and it is shown that whilst during the incubation period in both the blood is presumably infected, once fever has developed the blood generally ceases to be infective by the fourth day and often earlier. Monkeys commonly die before the fourth day of fever and their tissues are generally infective at death, but human patients rarely die before the 5th or 6th day of fever and consequently their blood has ceased to be infective before death. This would seem to offer some explanation of the large number of cases of laboratory infection that have occurred since monkeys were used, as compared with the absence of any record of disease being acquired by conducting post-mortem examinations on the human cases of yellow fever. The method of infection in these laboratory cases seems to have been by passage of the virus through the intact skin and records are given of recent infections among the author's laboratory attendants, and also in hospital technicians. [For full details of these cases see below, LOW & FAIRLEY, p. 290.] Two of these persons could have acquired the infection only when performing a blood examination on human yellow fever blood and in both instances developed the disease exactly 10 days after coming in contact with the infected material. The blood of one of these patients was found to be infective to monkeys on the fourth day of fever, in spite of the injection of 30 cc. of immune serum on the third day. These laboratory infections were acquired from a Brazilian virus that had been passaged through monkeys for a year and included a mild case and severe cases, one fatal; it is evident, therefore, that passage in monkeys does not diminish the virulence of the virus towards human subjects.

Transmission by mosquitoes. It was found that the incubation period elapsing before the mosquito becomes infective might be as short as 9 days at a constant temperature of 28° C., or indefinitely prolonged if the mosquitoes were kept at low temperatures. Thus a mosquito that has ingested virus, if kept at a temperature of 10° to 15° C., does not become infective, but if after several weeks the temperature is subsequently raised to 28° C. it becomes infective. On the other hand, a mosquito that has become infective retains its infectivity by bite even

if kept at temperatures as low as 10° to 15° C. A mosquito may become infective if kept at temperatures as low as 18° C. but the incubation period is very prolonged. Concerning the proportion of *Aedes aegypti* becoming infected after feeding on a yellow fever monkey, in one experiment, out of 11 mosquitoes 5 (or 6) became infective, and in the remainder the infection died out. These mosquitoes were kept at a temperature of 28° C. A fatal infection was produced by the bite of a mosquito 118 days after it had been infected, and there seems no doubt that once infected a mosquito generally remains infective for the duration of its life. The inoculation of eggs laid by infected parents, and also of larvae, pupae and adults developing from such eggs, gave uniformly negative results, and it seems almost certain that the infection is not transmitted to the offspring of an infected mosquito. With reference to the passage of the virus from one mosquito to another during copulation [see ARAGÃO, this *Bulletin*, Vol. 26, p. 1001], the author found that this was due to a surface contamination of the insects' bodies with infected faeces and was removable by washing. Consequently these cases are considered to have no bearing on the persistence of the disease in nature. Experiments with immune serum and virus showed that the loss of infectivity to mosquitoes, which generally occurs after one to three days of fever, is due to the development of immune bodies in the blood and not to the disappearance of virus. Mosquitoes fed on a mixture of virus and immune serum failed to become infected and yet these mixtures were infective when inoculated into monkeys. In yellow fever cases the blood ceases to be infective to mosquitoes as soon as the concentration of immune bodies reaches a certain level, but the virus does not disappear from the blood till much later. The ingestion of immune serum was found to have no effect on the infection once it was established in the mosquito, and infected mosquitoes remained infective after having been fed on immune blood.

E. H.

FOWLER (James K.). **Recent Work on Yellow Fever.** [Correspondence.]—*Brit. Med. J.* 1931. Jan. 10. p. 73.

An interesting letter with special reference to the Yellow Fever Commission (West Africa), of which the writer was chairman. Apparently all the reports of this Commission not distributed at the time of publication were lost, and have only recently been found. Copies may now be obtained on application to Dr. A. T. STANTON, or to the Crown Agents for the Colonies, Millbank. It is unfortunate that the urgent representations made in these reports did not receive more attention at the time, for the likelihood of monkeys and especially "howlers" being susceptible to yellow fever was embodied in their scheme for further research.

The numerous laboratory infections which have recently occurred in this country and elsewhere, leading to illnesses so diverse in clinical type as to be unrecognizable except for the fact that they have conferred immunity to the disease, enable us to understand how impossible it was 17 years ago for the investigators of that Commission to identify among the natives a disease which could be the means of keeping the infection alive during the often long intervals between its appearances in epidemic form among the Syrians and Europeans.

E. H.

JAMES (S. P.). Les résultats des recherches récentes sur la fièvre jaune envisagés au point de vue des mesures destinées à empêcher la propagation de la maladie. [**The Results of Recent Work on Yellow Fever with Special Reference to Measures for preventing the Spread of the Disease.**—*Bull. Office Internat. d' Hyg. Publique.* 1930. Dec. Vol. 22. No. 12. pp. 2278–2290. With 3 folding maps. [1 ref.]

A summary of recent work bearing on the methods of transmission and prevention with special reference to the problem of devising measures for preventing the spread of yellow fever. This problem is particularly important in view of the establishment of a number of air routes in both America and Africa, many of which pass through localities that have been known to be infected with yellow fever comparatively recently. Three maps show the routes and also indicate localities which have had cases of yellow fever within the last twenty years. The article concludes with a useful summary of all these localities given in tabular form.

E. H.

JAMES (S. P.). Quelques données récentes intéressant la prophylaxie de la fièvre jaune. [**Recent Observations on Yellow Fever Prophylaxis.**—*Bull. Office Internat. d' Hyg. Publique.* 1930. Aug. Vol. 22. No. 8. pp. 1479–1480.

Attention is drawn to the results of BEEUWKES, BAUER and MAHAFFY (above, p. 283) on the prevalence of yellow fever in West Africa. With regard to the mosquitoes carrying the disease, it is found that the elimination of wells by providing town water supplies has been sufficient to cause the numbers of these insects to fall below the danger level. It is evident that yellow fever readily responds to prophylactic measures and is not among the more difficult diseases to combat.

E. H.

KLOTZ (Oskar) & BELT (T. H.). **The Identity of Yellow Fever Lesions in Africa and America.**—*Amer. Jl. Trop. Med.* 1930. Sept. Vol. 10. No. 5. pp. 299–304. [7 refs.] [Path. Dept., Univ., Toronto.]

The authors have compared the pathological changes in the tissues of 50 cases of yellow fever from West Africa with the tissues of 43 American cases. The so-called "Councilman necrosis" of the liver, to be described in another paper, was found to be constantly present in all the cases, as well as vacuolation and granular degeneration of the Kupffer cells. Cloudy swelling of the heart was another constant feature. Nuclear inclusion bodies were observed in 38 per cent. of the African cases, and only in 9.2 per cent. of the American, but the long formalin fixation in the case of most of the latter tissues may be a partial explanation of this discrepancy. The kidney is more severely affected in the African group although the lesions are of the same character in both groups. In general it is found that the nature of the pathological changes is identical in both African and American cases and any differences observed are compatible with the variations shown by different strains of the virus in both Africa and America.

E. H.

KLOTZ (Oskar) & BELT (T. H.). **The Pathology of the Spleen in Yellow Fever.**—*Amer. Jl. Path.* 1930. Nov. Vol. 6. No. 6. pp. 655-662. With 4 figs. on 2 plates. [4 refs.]

— & —. **The Pathology of the Liver in Yellow Fever.**—*Ibid.* pp. 663-688. With 1 chart in text & 1 coloured plate. [2 pages of refs.]

— & —. **Regeneration of Liver and Kidney following Yellow Fever.**—*Ibid.* pp. 689-697. [36 refs.] [Dept. of Path. & Bact., Univ., Toronto.]

These three articles are all concerned with the pathological changes in yellow fever, and add to the voluminous literature on the subject. The first two papers comprise a more extensive study of the histopathology of the spleen and liver, and the results agree with previous descriptions by KLOTZ and SIMPSON [this *Bulletin*, Vol. 25, p. 112]. It is of interest that the spleen shows none of the lesions characterizing the liver pathology of the disease. The cytoplasmic necrosis is lacking, fatty degeneration is negligible and there are no specific intranuclear inclusion bodies. In the yellow fever of Africa and America the most characteristic liver lesion is the acidophile degeneration in the cytoplasm of the parenchymal cells. This so-called Councilman lesion is very constant and is especially valuable in the diagnosis of human cases, which often do not show the intranuclear bodies. It cannot be confused with any other type of liver necrosis and the authors consider that in early stages it bears a certain similarity to the cytoplasm inclusions of other virus diseases. The mid-zonal distribution of these lesions in the lobules cannot be explained although the lesions themselves seem due to some toxic agent in the blood. Specific nuclear inclusions were found in the livers of 17 out of 19 *M. rhesus* infected with yellow fever, and in 23 out of 93 human cases of the disease.

The difficulty of distinguishing Weil's disease and yellow fever by clinical symptoms has led to a certain amount of confusion in previous descriptions of the pathology of the disease and the records of interstitial haemorrhage are probably a result of this confusion. Similarly wandering-cell infiltration has probably been described from cases of Weil's disease mistaken for yellow fever, as the authors found that exudative reactions were absent in all uncomplicated cases of the latter.

Referring to KUCZYNSKI and HOHENADEL'S observations [this *Bulletin*, Vol. 26, p. 296], in which they claimed to have identified a bacillus as the causal agent of yellow fever, the present authors state that the experimental lesions they described in their infected animals are not characteristic of this disease.

The third article contains particulars of the regeneration of the liver and kidney in 6 rhesus monkeys, 16 to 66 days after they had recovered from an attack of yellow fever. In every case complete and scarless regeneration occurred, which supports the clinical evidence that neither cirrhosis of the liver nor contracted kidney follows yellow fever in man. Except in chloroform poisoning there is no condition producing liver destruction of equal magnitude in which scar formation is not observed. The absence of fibrosis is said to be due to the peculiar immunity of the stroma structures to yellow fever; there is no stimulation of connective tissue cells during the acute stage of the disease. The reasons for this may be the non-inflammatory, non-autolytic character of the pathological condition and to the absence of thrombosis in the small parenchymal vessels. Regeneration originates in islands

of parenchymal cells which have survived the attack, and quickly restore the tissues to their original state.

E. H.

BURKE (A. W.) & DAVIS (N. C.). **Notes on Laboratory Infections with Yellow Fever.**—*Amer. Jl. Trop. Med.* 1930. Nov. Vol. 10. No. 6. pp. 419-426. [2 refs.] [Yellow Fever Lab., Internat. Health Division, Rockefeller Foundation, Bahia, Brazil.]

An account of three certain laboratory infections with yellow fever and also a probable one among Americans in Bahia, Brazil. The first of these patients was accidentally bitten by mosquitoes carrying the West African Asibi virus. He had received three 2 cc. doses of immune serum, the last about 4 months before this infection. The patient had a mild attack and showed no signs of albumin or casts in the urine and no jaundice. Two monkeys inoculated with blood taken 18 hours after the onset of illness had fever on the 5th day, but neither first nor second passage animals died. However, mosquitoes fed both on the patient and on one of these passage monkeys produced a fatal infection.

The second patient had received 2 cc. of a liver vaccine six months previously. The attack started suddenly and on the first day of fever he was given 14 cc. of human convalescent serum intravenously and the following day 18 cc. of immune serum from monkeys subcutaneously. The third day of the disease 20 cc. of yellow fever monkey immune serum were given in the early morning and later 50 cc. of anti-*icteroides* serum. The patient died on the evening of the fourth day of the disease. It is not known how this infection was acquired but the patient had performed an autopsy on an infected monkey 12 days before the onset of fever and also had bled an infected monkey 2 days before.

The third patient had lived in South and Central America for six years and had received 6 cc. of human convalescent serum 40 days before the onset of illness. He had a mild but typical attack of the disease which persisted for 4 to 5 days. Injections of human convalescent serum were given during the attack. It is not certain how the infection was acquired, but 4 days before the onset he had helped in drying some infected blood, and also about four weeks preceding the illness had lived in a hotel in the centre of the old endemic yellow fever district. No known cases had occurred in this neighbourhood for eight months but nevertheless the infection may have been present.

The fourth case received 16 cc. of human yellow fever immune serum only 23 days before the onset of illness. He had a very mild attack of yellow fever and albumin never appeared in the urine in sufficient amount to give a reliable quantitative test. During convalescence there was a faint trace of icterus. This patient had bled infected monkeys before the illness and had done serological work with the samples, but as in the two preceding cases the exact method of infection is not clear. In every case the nature of the disease was proved by inoculations into monkeys. The patient who died was the oldest of the four (50 years of age), had received no prophylactic human serum, and had been the shortest time in the tropics. The clinical symptoms, including the appearance of albumin and casts in the urine within less than 24 hours of the onset of fever, suggest that he may have had some previous renal involvement, but there is no definite evidence to this effect. Two patients (presumably the authors themselves) who received

immune serum after the onset of disease felt that it was of undoubted therapeutic benefit, as the fever subsided after its administration.

E. H.

Low (G. Carmichael) & FAIRLEY (N. Hamilton). **Observations on Laboratory and Hospital Infections with Yellow Fever in England.**—*Brit. Med. J.* 1931. Jan. 24. pp. 125–128. With 1 text fig. [5 refs.]

The grave risk attaching to the routine collection and examination of human blood in yellow fever is strikingly illustrated by this important article, which contains full details of three laboratory infections briefly referred to in a previous publication [HINDLE, *ante* p. 285]. The first patient presumably became infected through handling yellow fever monkeys, but the two others never came in contact either directly or indirectly with infected animals; they acquired the disease one in making blood slides and performing a white cell count, and the other in doing routine biochemistry on a specimen of blood sent to the laboratory. All three patients showed typical infections and one of them died five days after the onset of fever. In this case there was no evidence that the administration of convalescent serum on the first day of illness nor the injection of calcium lactate had any effect on the course of the disease. The blood of the other two patients was inoculated into monkeys respectively 64 and 89½ hours after the onset of the disease, and in both instances fatal infections were produced, although in the case of the latter patient 30 cc. of human convalescent serum had been administered the previous day.

It is evident therefore that there is considerable danger in the routine examination of blood in yellow fever cases during the first four days of illness, and in addition almost certainly during the incubation period. Consequently the authors recommend that in endemic areas, when the disease is prevalent, gloves should invariably be worn when taking blood, whether yellow fever is suspected or not.

E. H.

DINGER (J. E.), SCHÜFFNER (W. A. P.), SNIJDERS (E. P.) & SWELLEN-GREBEL (N. H.). Onderzoek over gele koorts in Nederland (vijfde mededeeling). [**Research on Yellow Fever in Holland.**]—*Nederl. Tijdschr. v. Geneesk.* 1930. Oct. 25. 74th Year. 2nd Half. No. 43. pp. 5253–5266. With 26 figs. on 1 folding plate. [17 refs.]

The 1st, 2nd, 3rd and 4th communications have already been noticed (this *Bulletin*, 1929, p. 1006; 1930, pp. 485, 486 & 869). This fifth communication deals with the pathological anatomy of the disease in monkeys. Yellow fever is sometimes difficult to diagnose in man and is especially liable to be confused with leptospirosis icterohaemorrhagica. It is still more difficult in monkeys. In this research post-mortem examinations were conducted on 76 rhesus monkeys, dead of yellow fever, and on 20 control animals of which one was normal and the remaining 19 had died of other diseases. In addition 16 cynomolgus monkeys and one nemestrinus with 3 controls were examined post-mortem. The material used, therefore, was on a considerable scale. The course of infection, in general, was most rapid with blood injection, less so with liver injection and still less so by mosquito bite. Of the

changes produced by the disease in the test animals the most significant were jaundice, skin haemorrhages, lung haemorrhages, blood in the stomach with mucosal haemorrhage and haemorrhagic erosion, a typical liver, congested spleen and granular pale kidney. The most characteristic of all the macroscopic changes are in the liver, which was yellow to yellowish-brown, friable, and when cut left a greasy smear upon the knife. Microscopically also the liver changes are the most important for diagnosis. In frozen sections of the liver a diffuse fatty degeneration was evident, which however was less intense around the central vein to a depth of 1 or 2 cells and thus gave rise to a wreath-like appearance. Necrosis in these monkeys was comparatively slight. Of the control animals none showed any appearance that could not easily be differentiated from that of the test animals except two dead of phosphorus poisoning. Paraffin sections of the liver in the yellow fever animals showed the general architecture of the liver to be not greatly altered. In the lobular columns there were more or less acidophile necrotic cells among the fatty cells. A very characteristic appearance was the acidophile intranuclear degeneration forming the inclusion bodies of TORRES, which may be looked on as diagnostic. These bodies, finely granular, butterfly shaped or half-moon shaped, have no connexion with the nucleolus and are found in greater numbers the greater the necrosis present. That they are indicative of the presence of the virus in the nucleus seems very doubtful. Their numbers in the liver were not proportional to the severity of the infection and they showed no evidence by any method of any more specifically staining central body. No leptospiras were found by Levaditi's method. Illustrations which accompany the article show skin petechiae, gastric haemorrhage and haemorrhagic erosion, fatty degeneration of the liver and the cellular sheath to the central vein, acidophile necroses and accompanying polynuclear infiltration and the specific Torres bodies.

W. F. Harvey.

DINGER (J. E.), SCHÜFFNER (W. A. P.) & SNIJDERS (E. P.). Untersuchungen ueber Gelbfieber in den Niederlanden. Impfversuche an Meerschweinchen. [**Dutch Studies on Yellow Fever. Inoculation Experiments with Guinea-pigs.**]*—Zent. f. Bakt. I. Abt. Orig.* 1930. Dec. 8. Vol. 119. No. 1/2. pp. 1-11. [4 refs.] [Colonial Inst., Amsterdam.]

The authors have made a careful series of experiments, graphically expressed in tabular form, on the susceptibility of the guinea-pig to yellow fever. Their results, to some extent, agree with those of KUCZYNSKI and HOHENADEL [see this *Bulletin*, Vol. 27, p. 478], who were able to obtain a modified form of the disease in guinea-pigs by the inoculation of infected material from monkeys. The present authors find that a disease can be produced in guinea-pigs and carried on through a series of animals, but after the second guinea-pig passage the virus became modified to such an extent that it was no longer possible to infect monkeys from the guinea-pigs. Thirty-seven guinea-pigs were inoculated with material from infected monkeys and of these 20 died, 9 with haemorrhages in the stomach, 3 with peritonitis, 4 with both these conditions, 1 with pseudotuberculosis, and 3 with no obvious pathological changes. The disease could also be transmitted from infected to normal guinea-pigs. Of 10 inoculated with infected liver material, 5 died, three with haemorrhages in lungs and stomach, and

two with peritonitis. Thirty-eight were inoculated with infected blood, of which 18 died, 9 with haemorrhages in lungs and stomach, 8 with peritonitis and one with no obvious pathological conditions; 2 were inoculated with peritoneal fluid and both died of peritonitis. Two guineapigs were infected by the bites of mosquitoes that had fed on a yellow fever monkey. They both died after 19 and 20 days, with stomach and lung haemorrhages. Mosquitoes that had fed on infected guineapigs were also found capable of transmitting the infection. All attempts to infect monkeys from guineapigs after the first passage gave negative results, and also all attempts to infect monkeys by the bite of mosquitoes that had fed on infected guineapigs.

E. H.

DAVIS (Nelson C.). **The Susceptibility of Marmosets to Yellow Fever Virus.**—*Jl. Experim. Med.* 1930. Sept. 1. Vol. 52. No. 3. pp. 405-415. With 1 plate. [5 refs.] [Yellow Fever Lab., Internat. Health Division, Rockefeller Foundation, Bahia, Brazil.]

The author has infected with yellow fever two species of marmosets, *Callithrix albicollis* and *Leontocebus ursulus*, by the bites of infected mosquitoes and also by the inoculation of infected blood. Moreover, the virus was passed back into rhesus monkeys after a varying number of passages through these marmosets. There is some indication that after a series of passages through *Callithrix albicollis* the virus loses some of its virulence for *Macacus rhesus*. Very few of these marmosets showed a definite fever and in the case of *albicollis* the lesions found at autopsy did not resemble those of yellow fever as seen in man, in *Macacus rhesus*, and in other species of monkeys. The convalescent serum of five that recovered was found to protect rhesus monkeys against yellow fever whilst the normal serum had no effect. In the case of the tamarins, *Leontocebus ursulus*, five were infected, of which four developed fever and all died. At least two showed liver changes comparable with those found in human beings and rhesus monkeys dead of yellow fever. It is conceivable that these little monkeys, which are often kept as pets, may have some importance in the spread of the disease in nature.

[KUCZYNSKI and HOHENADEL were the first to demonstrate the susceptibility of marmosets to yellow fever (see this *Bulletin*, Vol. 27, p. 87).]

E. H.

PHILIP (Cornelius B.). **Possibility of Mechanical Transmission by Insects in Experimental Yellow Fever.**—*Ann. Trop. Med. & Parasit.* 1930. Dec. 18. Vol. 24. No. 4. pp. 493-501. [7 refs.]

In view of the high concentration of yellow fever virus in the blood of infected monkeys, it might have been expected that mechanical transmission by biting insects would be liable to occur. The author has made careful experiments to test this point, using *Aedes aegypti* and *Cimex lectularius*. The insects were fed partially on an infected monkey and allowed to complete their meal, without any appreciable interval, on normal monkeys. Negative results were obtained in three experiments in which 39 to 100 mosquitoes were used. Nine adult bed-bugs and 50 larval and nymphal stages also failed to infect a normal rhesus monkey, during seven alternate transfers between the normal monkey

and an infected one during one feeding. Although 100 monkey lice (*Pedicinus* sp.), when removed from an infected monkey and immediately ground up and inoculated into a normal one, produced infection, there is no evidence that these lice are ever capable of transmitting the disease. The results of these experiments clearly indicate that there is no likelihood of yellow fever being spread mechanically by the bites of insects.

E. H.

FINDLAY (G. M.) & HINDLE (E.). **Guanidine-like Substances in the Blood in Experimental Yellow Fever.**—*Lancet*. 1930. Sept. 27. pp. 678–679. [13 refs.] [Wellcome Bureau of Scientific Research, London.]

The symptoms of yellow fever seem to be due rather to the toxins resulting from the lesions originated by the virus than to the virus itself, and with this object the authors have studied the toxins in order to determine methods for their neutralization. One of these toxins is shown to be a guanidine-like substance, the quantity of which increases in the blood of monkeys infected with yellow fever from an average of about 0.2 mgm. per 100 cc., up to more than double this amount. The toxic symptoms characteristic of this disease closely resemble those recorded as a result of guanidine poisoning, and also of carbon tetrachloride poisoning. Moreover, diminution in the blood sugar also occurs in these conditions as well as in yellow fever.

Calcium salts are known to have a highly protective action in treating intoxications associated with an increase in the guanidine base content of the blood, at the same time raising the blood sugar.

Consequently injections of 5 cc. of a 5 per cent. solution of calcium lactate were given to a monkey infected with yellow fever and after two hours the guanidine base content was found to have been reduced from 0.400 to 0.251 mgm. per 100 cc. of blood. Five hours later the quantity had again risen to 0.498 mgm., so it is evidently necessary to give injections at intervals of four to six hours. When this was done the guanidine content was kept down, but unfortunately, even when combined with glucose, it did not prevent the final collapse and death in monkeys suffering from yellow fever. These monkeys, eight in number, all showed typical necrosis of the liver, but in contrast with untreated animals, none of them showed any gastro-intestinal or pulmonary haemorrhages. Consequently there is some evidence that repeated injections of calcium may be of some use in preventing haemorrhage in yellow fever cases. Finally, the authors suggest that in view of the extremely low blood pressure, possibly associated with the presence of toxic amines in the blood, the intravenous injection of saline or of gum arabic, as used in cases of surgical shock, might be of value in the treatment of human cases of yellow fever.

E. H.

WAKEMAN (A. Maurice) & MORRELL (Clare A.). **Chemistry and Metabolism in Experimental Yellow Fever in *Macacus rhesus* Monkeys. II. Nitrogen Metabolism.**—*Arch. Intern. Med.* 1930. Sept. Vol. 46. No. 3. pp. 382–401. With 2 charts. [12 refs.]

The authors continue their observations on the study of changes in the blood and urine of yellow fever monkeys [see this *Bulletin*, Vol. 27, p. 876]. Their results indicate that the non-protein nitrogen, amino-acid, urea and

"rest" nitrogen of the blood increase considerably towards the end of the infection. The blood creatinine, uric acid and ammonia show little, if any, change. The amino acids increase both in absolute amount and in proportion to non-protein nitrogen, while the urea decreases in proportion to the latter. A few cases showed an absolute decrease in blood urea nitrogen. These changes were only found towards the end of fatal infections and did not occur during the early stages of the disease nor in those monkeys which recovered.

There were no marked changes in the partition of these substances in the urine. The changes during the terminal period are much more pronounced when the accumulation of these substances in the body fluids is taken into consideration. Organic acid and phosphorus excretion usually increase considerably during the disease.

All the metabolic changes observed can be interpreted as resulting from a loss of liver function and there was no definite evidence of serious impairment of kidney function, except a terminal anuria probably due to extreme reduction of blood pressure.

E. H.

SMITH (E. C.). **Hepatic Intranuclear Changes in Yellow Fever.**—*West African Med. J.* Lagos. 1930. Oct. Vol. 4. No. 2. pp. 45-46. With 4 figs (1 coloured) on 2 plates. [2 refs.] [Med. Research Inst., Lagos.]

The author found the characteristic acidophile intranuclear inclusions in the liver cells of 39 out of 40 *Macacus rhesus* infected with yellow fever, whilst in 10 normal monkeys these bodies were never found. The livers of 22 West African human cases were also examined, and of these 15 showed well-marked inclusions, whereas in 8 cases of death from other causes, blackwater fever, obstructive jaundice, relapsing fever, etc., no such bodies were found. [It is of interest that West African cases of the disease seem to show these inclusion bodies much oftener than Brazilian ones.]

E. H.

TORRES (C. Magarinos). **Dégénérescence oxychromatique et fièvre jaune chez le singe.** [**Oxychromatic Degeneration and Yellow Fever in the Monkey.**]—*C.R. Soc. Biol.* 1930. Dec. 12. Vol. 105. No. 34. pp. 727-729. With 4 text figs. [1 ref.]

———. **Dégénérescence oxychromatique et la fièvre jaune chez l'homme.** [**Oxychromatic Degeneration and Yellow Fever in Man.**]—*Ibid.* pp. 732-733. With 2 text figs. [1 ref.]

i. The first paper comprises further details on the nature of the intranuclear bodies developed in the liver cells of monkeys infected with yellow fever. The author disagrees with COWDRY and KITCHEN's account of these bodies [see this *Bulletin*, Vol. 27, p. 475]. He finds that the inclusions never present the aspect of individual acidophile granules, but consist of a "fundamental substance" and a stroma. The first is formed by oxychromatin and various nucleoproteins and stains pink with eosin, phloxin, and carmin; it does not stain with either methyl green or methylene blue. The fundamental substance shows unequal colouration owing to the stroma, which seems derived from the inner network of the nucleus.

ii. The second paper is concerned with these bodies in man, but of 17 yellow fever cases examined intranuclear bodies were found only in the liver cells of 3 patients: a four-year-old girl who died 40 hours after the first appearance of symptoms; a soldier who died on the second day of the disease; and a young man (19 years) who died on the sixth day. The inclusions resemble those present in yellow fever monkeys, but it is difficult to recognize early stages, owing to nonspecific alterations in the nucleoplasm causing the appearance of acidophile granulations which may be confused with those due to yellow fever.

E. H.

STEFANOPOULO (G. J.) & CODOUNIS (A.). Sur la protéinémie du singe et particulièrement du macaque atteint de fièvre jaune expérimentale. [**On the Proteinæmia of the Monkey and in particular of Macacus infected with Yellow Fever.**—*C.R. Soc. Biol.* 1930. Nov. 4. Vol. 105. No. 29. pp. 269-271. [3 refs.]

The authors have studied the protein content of blood of normal monkeys, and also others inoculated with yellow fever, some after having been vaccinated. Out of seven large baboons, three normal individuals gave figures ranging from 65.52 to 68.49 for the total protein content of the blood, whilst four immunized baboons (3 against poliomyelitis, and one against yellow fever) gave figures ranging from 63.77 to 94.56.

Nine *Macacus rhesus* were also examined. The results of the examination of five of them before and after various infections are given in a table. It is of especial interest that although infection with yellow fever caused a marked decrease in the total proteins, vaccination with a formolized yellow fever vaccine produced no change in the protein content. These monkeys were subsequently inoculated with yellow fever virus and found to be protected. On the other hand the baboons that had been inoculated repeatedly with yellow fever virus and developed antisera, showed an increase in the protein content.

E. H.

DINGER (J. E.), SCHÜFFNER & SNIJDERS. Untersuchungen über den Erreger des Gelbfiebers. Züchtungsversuche. [**Studies on the Aetiology of Yellow Fever. Culture Experiments.**—*Zent. f. Bakt.* I. Abt. Orig. 1931. Jan. 20. Vol. 119. No. 5/6. pp. 304-311. [9 refs.]

—, — & —. Onderzoek naar den verwekker der gele koorts. — *Nederl. Tijdschr. v. Hyg., Microbiol. en Serol.* 1931. Vol. 5. No. 3. pp. 160-171. [11 refs.]

The authors have made a very exhaustive series of experiments on the cultivation of yellow fever material, mainly with the object of deciding the aetiological significance of *Bacillus hepatodystrophicans*, described by KUCZYNSKI and HOHENADEL [this *Bulletin*, Vol. 27, pp. 478 & 482] as the causative organism of this disease. Although various bacteria were occasionally cultured from yellow fever tissues, it is shown that these are generally diphtheroids derived from the air, and tubes containing yellow fever tissues in Kuczynski's medium, when infected experimentally by breathing in them or exposure to air, showed a growth of a diphtheroid bacillus which could not be distinguished from *B. hepatodystrophicans*. Monkeys inoculated with these cultures and also with cultures received from Professor Kuczynski showed no signs of any infection with yellow fever and no immunity. Yellow fever virus was found to live in culture tubes containing this bacillus for 2 days at 37° C. The authors conclude that this diphtheroid bacillus is identical with *B. hepatodystrophicans* and is derived from the air; it has no significance therefore in the aetiology of yellow fever.

E. H.

BUCHBINDER (Leon). **Yellow Fever: a Filtrable Virus Disease.**—*Arch. Pathology.* 1930. Oct. Vol. 10. No. 4. pp. 589-603. [92 refs.] [College of Physicians & Surgeons, Columbia Univ., New York.]

A comprehensive and accurate summary of recent work on yellow fever, giving an excellent idea of the present position of our knowledge of the subject.

E. H.

BARROSO (Sebastião). Quelques aspects de la campagne sanitaire contre la fièvre jaune à Rio de Janeiro. [**Certain Aspects of the Sanitary Campaign against Yellow Fever at Rio de Janeiro.**]—*Rev. Sud-Américaine de Méd. et de Chirurg.* Paris. 1930. Oct. Vol. 1. No. 10. pp. 1015-1019.

After drawing attention to the great financial losses involved in past yellow fever epidemics, the author discusses the sanitary methods that have been used against them and clearly shows the superior efficacy of those used in the recent epidemic.

E. H.

ARAGAO (Henrique de Beaurepaire). Possibilité de la transmission directe de la fièvre jaune, de Stégomyie à Stégomyie.—*C.R. Soc. Biol.* 1929. Nov. 8. Vol. 102. No. 29. pp. 474-475.

ARAGAO (Henrique de Beaurepaire). Infection des *Aedes aegypti* males avec les virus de la fièvre jaune.—*C.R. Soc. Biol.* 1929. Nov. 8. Vol. 102. No. 29. p. 476. [1 ref.]

ARAGAO (H. de Beaurepaire) & LIMA (A. da Costa). Transmission de la fièvre jaune par l'application de fèces de moustiques infectés sur la peau et la muqueuse oculaire intactes.—*C.R. Soc. Biol.* 1929. Nov. 8. Vol. 102. No. 29. pp. 477-478. [1 ref.]

ARAGAO (H. de Beaurepaire) & LIMA (A. da Costa). Sur le temps minimum nécessaire aux Stégomyies infectées pour excréter des fèces virulentes.—*C.R. Soc. Biol.* 1929. Nov. 8. Vol. 102. No. 29. pp. 478-480.

BARROSO (Sebastião). A febre amarella no Brasil. A nova phase da campanha.—*Brasil-Médico.* 1930. Mar. 29. Vol. 44. No. 13. pp. 374-376.

DUREN (A. N.). Les mesures prises contre la fièvre jaune à Matadi en 1928.—*Bull. Office Internat. d'Hyg. Publique.* 1930. Feb. Vol. 22. No. 2. pp. 287-306. With 2 charts in text. [1 ref.]

HOFFMANN (W. H.). Die Ätiologie des Gelben Fiebers.—*Seuchenbekämpfung.* 1929. Vol. 6. No. 4. pp. 234-237.

HOFFMANN (W. H.). Die Immunitätsverhältnisse beim Gelbfieber und ihr Einfluss auf die Epidemiologie.—Reprinted from *Immunität, Allergie und Infektionskr.* 1929. Vol. 1. No. 12. pp. 377-386. [Finlay Inst., Havana, Cuba.]

JORGE (Ricardo). A febre amarella e a campanha sanitaria no Rio de Janeiro (1928-1929).—*Brasil-Médico.* 1930. June 14 & 21. Vol. 44. Nos. 24 & 25. pp. 649-653; 676-680.

LEGER (Marcel). La transmission de la fièvre jaune d'après les données récentes.—*Gaz. hebdom. Sci. Méd. de Bordeaux.* 1930. Feb. 2. Vol. 51. No. 5. pp. 65-70. [18 refs.]

LE PRINCE (H.). Sur les mesures qui peuvent empêcher la propagation de la fièvre jaune.—*Bull. Office Internat. d'Hyg. Publique.* 1930. Dec. Vol. 22. No. 12. pp. 2291-2294.

LINS (Sinval A.). A febre amarella através um seculo de observação clinica e orientação scientifica.—*Brasil-Médico.* 1930. Mar. 1 & 8. Vol. 44. Nos. 9 & 10. pp. 280-288. [41 refs.]

PICHAT (Jean). Note sur l'urine des sujets atteints de fièvre jaune.—*Marseille-Méd.* 1929. Sept. 25. Vol. 66. No. 27. pp. 372-374.

RELAPSING FEVER AND OTHER SPIROCHAETOSSES.

CAZANOVE. La fièvre récurrente à poux dans les colonies françaises de l'Afrique occidentale et centrale.—*Bull. Office Internat. d' Hyg. Publique.* 1930. Nov. Vol. 22. No. 11. pp. 2135-2142. [1 ref.]

LASNET. La fièvre récurrente à poux en Afrique Française. [**Louse transmitted Relapsing Fever in the French African Colonies.**]—*Ann. de Méd. et de Pharm. Colon.* 1930. July-Aug.-Sept. Vol. 119. No. 3. pp. 408-417.

These two papers contain an account of the incidence of relapsing fever in the French African colonies from 1924 to 1928 inclusive, in continuation of GOUZIEN's report to the end of 1923.

In French Equatorial Africa, in the region of Chad, the situation seems a little uncertain and it is difficult to say whether the disease will disappear as in Nigeria, or persist in isolated regions as in the Upper Volta. In French West Africa this persistent centre of infection in the Upper Volta is of great importance from a prophylactic point of view, as it may constitute a source of future epidemics. In addition the disease has become established in Senegal, in the Cayor region near the sea, and in spite of free communication, it does not seem to spread inland. The persistence of the infection in this neighbourhood is attributed to the presence of small wild rodents, which serve as a reservoir for the virus. [In the absence of *Ornithodoros*, which have not been found in this part of Africa, the manner in which rodents would serve as a reservoir for a louse transmitted relapsing fever is not quite evident.]

E. Hindle.

LASNET. Communication sur la marche de la fièvre récurrente en Afrique centrale. [**The Spread of Relapsing Fever in Central Africa.**]—*Bull. Acad. Méd.* 1930. July 22. Year 94. 3rd Ser. Vol. 104. No. 29. pp. 112-114.

This disease broke out in "the Upper Guinea" about ten years ago, probably introduced by natives from the Mediterranean region; it then spread across to the Sudan [see this *Bulletin*, Vol. 27, p. 691]. The first cases were observed in 1921 at Kouroussa among Moroccan and Algerian soldiers. It spread down the Niger and at Segou 1,200 deaths were recorded between December 1921 and March 1922. During this year it travelled east through the Dori region and is estimated to have caused 5,000 to 6,000 deaths. During 1923, small outbreaks occurred further west, but the main epidemic was towards the east, especially on each side of the road to Say. The mortality was not less than 14,000. The following year no cases were recorded in Guinea, but in the Upper Volta region and across to Koutiala the epidemic caused at least 20,000 deaths. In 1925, the outbreak died down in the Upper Volta and Sudan, but broke out in the region of Lake Chad and invaded the north of the Cameroons; the mortality is estimated at 9,000 deaths. Subsequently the disease lasted until 1929 in the North of Equatorial Africa, but never spread to the South among the wild naked tribes of that region. About 10 per cent. of the population of the affected regions died of the disease, the mortality varying from 5 to 25 per cent. of the population. Although the epidemic has now ceased there are isolated endemic centres in the Upper Volta and Chad regions; possibly the infection is maintained in animal reservoirs.

Novarsenobenzol has been generally used for treatment and has given very good results. Prophylaxis has been based on the destruction of body lice and the efforts of the sanitary authorities [combined with the general absence of clothing towards the south] have been successful in checking the further spread of this severe epidemic.

E. H.

DE PAOLI (Paolo). Osservazioni sopra un focolaio epidemico di febbre ricorrente in Eritrea. [**A Focal Epidemic of Relapsing Fever in Eritrea.**—*Arch. Ital. Sci. Med. Colon.* 1930. May 1. Vol. 11. No. 5. pp. 303-309. English summary (5 lines) p. 310. [Regina Elena Colonial Hosp., Asmara.]

In July-October, 1929, several cases of relapsing fever were met with in Asmara. When looking for the possible source of infection the author noticed several persons, transient visitors and beggars, who appeared ill, and examination of their blood showed in a single day 6 of them to be harbouring spirochaetes. The exacerbations of fever lasted for 10 days at a time. It is believed that the disease had been introduced by travellers from Abyssinia. Search failed to discover any ticks, but *Pediculus vestimentis* was found on all the patients and *Cimex lectularius* where they slept.

H. H. S.

FRANCHINI (Giuseppe). Distribuzione degli Ixodidi nello Jemen (Arabia meridionale). Reperto di Spirochete nei pidocchi della città di Sana. [**Ticks in Jemen (Southern Arabia). Spirochaetes in Lice in Sana.**]—*Arch. Ital. Sci. Med. Colon.* 1930. Aug. 1. Vol. 11. No. 8. pp. 449-452. With 2 text figs. (1 map). English summary (6 lines).

Professor Franchini proceeding with his survey (see this *Bulletin*, Vol. 27, p. 925) has found four species of ticks in Jemen: *Amblyomma variegatum*, *Hyalomma aegyptium*, *Rhipicephalus evertsi* and *R. sanguineus*. All four were present in Hodeida on the coast, the second only in Taiz, this and the fourth in Sana (both inland towns). The same four species had been found in Eritrea. He examined by serial sections bugs, lice and ticks, and in the lice alone spirochaetes were present, and the author believes, therefore, that the relapsing fever of this district is louse-borne.

H. H. S.

KATZ (D. I.). Sur les espèces du typhus recurrens aux Pamirs. [**Relapsing Fever in the Pamirs.**]—*Pensée Méd. d'Usbéquistan et de Turquéménistan*. Tashkent. 1930. Aug.-Sept. No. 11-12. pp. 5-12. With 7 text figs. [In Russian.]

The author describes 38 cases of relapsing fever of the "Persian variety" observed in the Western part of the Pamir region bordering with India and Afghanistan. The elevation of the district is between 1,700 and 2,800 metres, but the disease does not occur above 2,000 metres. The condition was formerly diagnosed as a form of quinine-resistant malaria, but according to the author malaria is absent in this country. In typical cases the course of the disease is as follows: After an incubation period of 6-8 days there is a sudden rise of temperature to 39-40° C., which is maintained as long as the attack lasts. In untreated cases there are 7-9 attacks with apyretic periods of 6-24 days. The rise in temperature is accompanied by rigor, cyanosis, headache, pain in the lumbar region, and sometimes followed by vomiting.

The spleen and liver were not enlarged in all cases, but were sensitive to palpation. Scanty spirochaetes were present in all cases. The author found that neosalvarsan was most effective when administered by the "method of saturation," i.e., independently of the stage of disease, as follows: On the first day of attack or of apyrexia 0.3 gm., 3-4 days later 0.45 gm., 5-6 days later 0.6 gm., a total of three injections. As the result of treatment the number of attacks diminished considerably and they assumed a mild form. Irregular administration of neosalvarsan, on the other hand, only prolonged the apyretic period without any appreciable alleviation of the symptoms. C. A. Hoare.

WELLER (Burford) & GRAHAM (G. M.). **Relapsing Fever in Central Texas.**—*Jl. Amer. Med. Assoc.* 1930. Dec. 13. Vol. 95; No. 24. pp. 1834-1835.

This is the first definite record of the existence of tick-transmitted relapsing fever in the U.S.A., and is of especial interest since the authors were able to trace the source of infection. This was a cave in the Colorado River valley, about 75 miles above Austin, which contained very large numbers of *Ornithodoros turicata*. Three out of four boys who entered this cave and were bitten by these ticks developed typical relapsing fever exactly six days later and all suffered from three or more febrile attacks. One of the authors who also entered this cave was bitten by a tick and developed fever on the seventh day; spirochaetes were found in his blood 18 hours later and 1.3 gm. of neoarsphenamine was given intravenously. This had no obvious effect and a second dose of 0.6 gm. was given 18 hours later, which caused the temperature to fall at once and there were no relapses. This cave was frequented by goats and sheep and also by various wild animals, but had only very rarely been visited by human beings, so the infection must have been maintained in some animal host. Some of the ticks were fed on a rabbit which became ill on the sixth day and died with numerous spirochaetes in its peripheral blood. These are said to vary in length from 18 to 25 microns, with ten to fifteen spiral turns. E. H.

BANNISTER (Kimball). **Relapsing Fever** (*Febris recurrens*, **Ruckfallfieber**, **Spirillum Fever**, **Tick Fever**).—*Southwestern Med.* 1930. Dec. Vol. 14. No. 12. pp. 581-582.

The record of a case of relapsing fever which developed after the patient has spent a vacation in the neighbourhood of Greer, Arizona. The symptoms were typical and during the seventh febrile attack spirochaetes were found in the blood.

[Although the source of infection is not stated, the number of febrile attacks and the locality suggest the likelihood of ticks being responsible (see above).] E. H.

DELANOË (P.). Le rôle du porc-épic comme réservoir de virus du spirochète marocain, *S. hispanicum* var. *marocanum* Nicolle et Anderson, 1928. [**The Porcupine as a Reservoir of the Moroccan Spirochaete**, *S. hispanica* var. *marocana*.]—*C.R. Acad. Sci.* 1930. Dec. 29. Vol. 191. No. 26. pp. 1481-1484. [2 refs.]

The author examined 17 porcupines, 2 young and 15 adult, caught in Morocco, and by inoculating blood from each into a series of guineapigs was able in one instance to infect one of these animals with the spiro-

chaete of Moroccan relapsing fever. Seven adult porcupines were inoculated with large doses of this spirochaete, and all except one were completely immune; one individual showed a mild infection. These individuals showed a polyvalent immunity against the various immunologically distinct strains of spirochaetes occurring in Morocco, which suggests that the porcupines in wandering about are repeatedly infected by the *Ornithodorus* inhabiting their burrows.

E. H.

DELANOE (P.). Sensibilité du renard au spirochète marocain, *Sp. hispanicum* var. *marocanum* Ch. Nicolle et Ch. Anderson, 1928. Le renard réservoir de virus de ce spirochète. [**The Susceptibility of the Fox to Moroccan Relapsing Fever, *S. hispanica* var. *marocana*. The Fox as a Reservoir.**]—*C.R. Acad. Sci.* 1931. Jan. 12. Vol. 192. No. 2. pp. 116–119. [1 ref.]

In a previous article the author recorded the presence of infected *Ornithodorus* in the burrows of foxes. Two young Algerian foxes were inoculated intraperitoneally with blood containing the Moroccan spirochaete and both became infected, one showing a relapse. The infection was very mild and the blood ceased to be infective after 25 days and in one the nervous system failed to infect after 35 days. A third fox was infected by the bites of *Ornithodorus* and although spirochaetes could never be found, 2.5 cc. of its blood, collected on the tenth day, produced infection in two guineapigs. Three young Moroccan foxes were found naturally infected with this spirochaete as tested by blood inoculation into guineapigs. Two adult Moroccan foxes were found to be uninfected and the blood of one that was tested was found to be protective against the spirochaete, and also this individual was completely resistant to a large dose of infected blood.

The results indicate that in Morocco the young fox is susceptible to the local relapsing fever, and may serve as a reservoir of the disease, since it evidently becomes infected in nature.

E. H.

SOFIEFF (M. S.). Vergleichende serologische Untersuchungen an Stämmen der Recurrens-Spirochäten. [**Comparative Serological Researches on Strains of R.F. Spirochaetes.**]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1930. July. Vol. 34. No. 7. pp. 382–386. [Inst. for Ship & Trop. Diseases, Hamburg.]

SAGEL (W.). Ueber die wechselseitigen Beziehungen verschiedener Recurrensstämme, besonders von *Spirochaeta Duttoni* und *Spirochaeta Berbera* (Marokko) nach neueren Erfahrungen an Paralytikern. (Ein Nachtrag zur Arbeit von Sofieff in Heft 7 dieser Zeitschrift.)—*Ibid.* Aug. No. 8. pp. 429–439.

The first author has compared four strains of relapsing fever spirochaetes, viz.:—*S. duttoni*, Hamburg, obtained by FÜLLEBORN and MAYER in East Africa in 1906, and maintained in ticks and white mice; *S. hispanica*, obtained from infected *Ornithodorus marocanus* received from Spain in 1927; a Moroccan strain (*S. berbera*?), isolated from a patient in 1927 and maintained in mice; and finally an Angola strain, isolated from a patient in 1928 and subsequently kept in mice. Adhesion, agglutination and cross immunity tests were made with these strains. The results show that the Moroccan strain and the Hamburg

strain of *S. duttoni* were indistinguishable, but were different from the Angola and *hispanica* strains. The two latter were also distinct from each other. The strain of *S. duttoni* and the Moroccan strain were used by SAGEL in the treatment of general paralysis [see this *Bulletin*, Vol. 25, p. 591] and in man were found to be distinct. In mice, however, the two strains have become indistinguishable, a fact which is very difficult to explain.

ii. The second article contains full details of the changes that have occurred in these two strains during the past two years, based on inoculations into human subjects, and also further particulars about the other two. All four strains have retained their pathogenicity towards man. The *duttoni* and Moroccan strains produced persistent brain infections in the mouse, whilst the other two did not. After passages through the brain of the mouse the two former strains seem to have become indistinguishable.

When patients that had recovered from infection with a strain of *S. duttoni* were subsequently inoculated with the original Moroccan strain (*S. berbera*) they all showed spirochaetes in the blood, but after this strain had passed through the brain of a mouse, it no longer produced any infection when inoculated into patients immune against *S. duttoni*. The *hispanica* strain tested in these immune patients four times failed to produce infection and five times succeeded. The Angola strain produced infection in all the patients tested who were immune against the other strains. Tables are given illustrating the results of various immunity tests in human patients. Four patients immune against the original Moroccan strain were subsequently inoculated with *S. duttoni* after passage through a mouse brain. Two of them became infected and two were resistant. Later 5 patients immunized against a brain passage strain of *S. berbera* were all resistant against a similar strain of *S. duttoni*, but were susceptible to the *hispanica* and Angola strains. But of 7 patients immunized against the *hispanica* strain, three became infected and two were resistant when subsequently inoculated with a brain passage strain of *S. berbera*, also an inoculation of the original *berbera* strain produced infection. All these patients were resistant to a subsequent inoculation of *S. duttoni* after brain passage, whilst one individual who had only received an injection of *hispanica* showed a very heavy infection when inoculated with this *duttoni* strain. Patients immunized against the Angola strain were half of them resistant to a brain passage strain of *S. berbera*, whilst the other half became infected; those tested were all susceptible to *hispanica*.

The results show that marked changes are undergone by these organisms as a result of brain passage in the mouse. In addition to the disappearance of any serological distinction between the two strains, they seem to have increased in virulence to man as a result of the brain passage. A similar increase in virulence has also been observed in the *hispanica* strain as a result of passage in human patients. E. H.

PLAUT (F.) & GRABOW (C.). Ueber die Rolle der Schutzstoffe des Blutes für die kritische Beendigung der Fieberanfälle und für die Entwicklung der Immunität bei der Impfrekurrenz des Menschen. [**Inoculated Relapsing Fever: Rôle of Protective Substances in the Blood for the Termination of Febrile Attacks, and in the Development of Immunity.**]—*Ztschr. f. Immunitätsf. u. Experim. Therap.* 1930. Vol. 68. No. 5/6. pp. 494–509. With 6 charts in text. [11 refs.]

The authors have studied the development of immune bodies in the blood of six patients infected with a strain of *S. duttoni* and obtained

very interesting results suggesting that the termination of each febrile attack is not dependent on the production of antibodies. The serum of these patients was collected at various intervals and protection tests made in mice. The method of applying these tests was to inactivate the serum at 56° C., then mix various dilutions with infected mouse blood so that each microscopic field contained one spirochaete, and finally 0.1 cc. of guineapig serum was added for complement. The mixture was left at room temperature for 15 minutes and then inoculated intraperitoneally into white mice.

The results indicate that after the earlier relapses the serum had no protective action and in one individual there was none even after four febrile attacks. Then the serum gradually acquired a protective action which increased after successive relapses until after intervals varying from 23 to 60 days it became strongly protective. This high concentration of immune bodies very soon diminished and generally was found to disappear within one or two years, sometimes earlier. Although the blood of these patients may be free from antibodies, they are refractory against reinfection. These facts show that the disappearance of spirochaetes is not dependent on the protective substances in the blood, and their sudden death at the end of each attack is not yet explained.

E. H.

LEVADITI (C.), ANDERSON (T.), SELBIE (F. R.) & SCHOEN (R.).
L'encéphalite récurrentielle. [**Encephalitis of Relapsing Fever.**]—
Bull. Acad. Méd. 1930. June 17. Year 94. Ser. 3. Vol. 103.
No. 24. pp. 672-690. With 12 text figs. [5 refs.]

It has been shown by the authors that relapsing fever spirochaetes [a Brazzaville strain of *S. duttoni* was used] will persist in the central nervous system of immune animals such as mice, rats, monkeys and rabbits. Sooner or later the majority of such animals show a type of encephalitis resembling that of general paralysis. A detailed description is given of the pathological changes in the brains of rabbits and various species of monkeys, which had been exposed to infection with *S. duttoni* and subsequently showed residual brain infections and signs of encephalitis. Occasionally the encephalitis was present although the brain had ceased to be infective, but in the majority of cases the two occurred together. In spite of prolonged examination with dark ground illumination, and of silver stained tissues, the authors never succeeded in finding spiral forms in the brains of rabbits and monkeys showing marked encephalitis, yet these tissues were proved to contain the spirochaetal infection by inoculation experiments in mice.

By a study of rats infected with *S. duttoni* the authors have traced the rare invasion of the brain parenchyma by individual spirochaetes, which disappear at the same time as those in the blood; although spirochaetes cannot be seen in such brains, yet they remain virulent for some months in some invisible form. This invisible stage of relapsing fever spirochaetes cannot be preserved in glycerine, and also cannot be separated from the nervous tissue by filtration.

E. H.

MATHIS (C.) & DURIEUX (C.). *Persistence de Sp. Duttoni*, var. *crocidurae* dans le cerveau et dans la rate de la souris infectée expérimentalement. [**The Persistence of *S. duttoni* var. *crocidurae* in the Brain and Spleen of Infected Mice.**—*Bull. Soc. Path. Exot.* 1930. Oct. 8. Vol. 23. No. 8. pp. 862–866. [Pasteur Inst., Dakar.]

The series of experiments performed by the authors show that this strain of *S. duttoni*, originally isolated from a shrew mouse at Dakar, may persist in the brains of infected mice up to 235 days after being inoculated. Brain infection seems to be a constant feature of this spirochaete and always persists for several weeks; consequently the number of animal passages, necessary for keeping the virus, can be much reduced. Out of 46 inoculated mice only one failed to show a brain infection and this failure is attributed to faulty technique.

There seems to be no relation between the duration of the brain infection and the period elapsing before the appearance of spirochaetes in the blood of mice inoculated with the infected brain material. Thus, in the case of one mouse inoculated with brain emulsion 235 days after the mouse concerned was infected, the spirochaetes appeared in the circulation on the 6th day, whilst another inoculated with brain emulsion of a mouse on the 50th day of infection did not show spirochaetes in its blood until the 10th day.

The spirochaetes were found to persist in the spleen up to the 165th day after infection, but this persistence was not constant, as only 8 out of 19 mice showed a residual spleen infection. Only mild infections are produced by the inoculation of infected brain material, suggesting an attenuation of the virus, but by passage into other mice normal infections are obtained.

E. H.

REMLINGER (P.) & BAILLY (J.). Comportement du *Spirochaeta hispanicum*, var. *maroccanum* (souche Tétouan) dans le cerveau des animaux réceptifs et réfractaires. [**The Behaviour of *S. hispanica* var. *marocana* (Tetuan Strain) in the Brains of Susceptible and Refractory Animals.**—*C.R. Soc. Biol.* 1930. Nov. 21. Vol. 105. No. 31. pp. 433–435. [2 refs.] [Pasteur Inst. of Morocco, Tangiers.]

The authors have inoculated guineapigs intracerebrally and in addition various refractory animals such as the fowl, pigeon and tortoise, with this strain of spirochaetes. The results of subsequent examinations show that the organisms persist in the brains of all these animals, whether susceptible or not. In refractory animals, the spirochaetes persisted approximately the same length of time as in infected blood kept in glass pipettes (about 45 days).

These results differ from those obtained with rabies virus, in which the brains of susceptible animals cease to be infective shortly after being inoculated and pass through a negative period of varying duration before again becoming infective. In refractory animals, on the contrary, the virus persists in the brain for very long periods (at least 275 days in the tortoise), and there is no negative period following the inoculation.

E. H.

KRITSCHESKI (I. L.). Ueber den Mechanismus der Wirkung von Wismutverbindungen auf Spirochäten. [**The Mode of Action of Bismuth Compounds on Spirochaetes.**—*Zent. f. Bakt.* I. Abt. Orig. 1930. Aug. 28. Vol. 118. No. 1/2. pp. 16-25. [7 refs.] [Microbiol. Research Inst., Education Commissariat R.S.F.S.R., Moscow.]

The author has studied the action of bismuth compounds in mice infected with *S. recurrentis* and from his results is of the opinion that the bismuth acts directly on the organisms and not indirectly as suggested by UHLENHUTH and his colleagues [see this *Bulletin*, Vol. 26, p. 672].

A comparison is made between splenectomized and ordinary mice, infected with *S. recurrentis* and subsequently treated with bismuth-yatren A. Thirty-nine per cent. of the splenectomized mice lived in spite of the absence of this important part of the reticulo-endothelial system, as compared with 87.9 per cent. of non-splenectomized mice similarly treated. Although more of the latter survived it is pointed out that 90 per cent. of splenectomized mice succumb to the infection, whilst the mortality in non-splenectomized animals is 48.3 per cent. This difference would account for the smaller percentage of splenectomized mice that were cured by the bismuth-yatren A.

It is evident in these experiments that the absence of the spleen has not appreciably affected the therapeutic action of the bismuth compounds, and it is necessary to assume that the bismuth has a direct action on the spirochaetes independent of the reticulo-endothelial system.

E. H.

MURATET (L.) & LE GAC (P.). Contribution à l'étude de la formule leucocytaire du typhus récurrent. [**The Leucocyte Formula in Relapsing Fever.**—*Bull. Soc. Path. Exot.* 1930. July 9. Vol. 23. No. 7. pp. 697-702. [16 refs.]

The authors give a useful summary of previous observations on this subject and finally give the leucocyte counts of 14 patients suffering from relapsing fever at Wadai, Central Africa. The number of polymorphonuclears and mononuclears did not alter appreciably, but a more detailed examination showed that the number of lymphocytes diminished whilst the mononuclears increased, and the number of polymorphonuclears increased at the expense of the eosinophiles. In addition the Arneth index was always deviated towards the left.

E. H.

REMLINGER (P.) & BAILLY (J.). Absence d'immunité héréditaire dans la fièvre récurrente marocaine. [**Absence of Hereditary Immunity in Moroccan Relapsing Fever.**—*C.R. Soc. Biol.* 1930. June 6. Vol. 104. No. 19. pp. 460-462. [Pasteur Inst., Tangiers.]

It is well known that in laboratory animals the immunity conferred by an attack of relapsing fever is of comparatively short duration, rarely more than three or four months; consequently it is unlikely that the offspring of immune parents would show any inherited resistance. The offspring of 4 guineapigs, in which one or both of the parents had been immunized against infection with a Tetuan strain of Moroccan relapsing fever, were all found to be as susceptible as normal animals.

E. H.

VAN DEN BRANDEN (F.), DUMONT (P.) & NELIS (P.). Contribution à l'étude du métabolisme du glucose sanguin dans la spirillose expérimentale. [**Blood Sugar Metabolism in Experimental Spirochaetosis.**]—*Ann. Soc. Belge de Méd. Trop.* 1930. June 30. Vol. 10. No. 2. pp. 215-222. [3 refs.] [Central Lab., Administration of Hyg., Brussels.]

The authors used guineapigs infected with a strain of *Spirochaeta hispanica* received from Tunis. The amount of glucose in the blood was estimated by Folin and Wu's method. The examination of the blood in 26 guineapigs showed that the normal quantity of glucose is in the neighbourhood of 1 per 1,000 and does not vary more than 0.2 from this figure. Particulars are given in tabular form of 9 guineapigs infected with *S. hispanica*, whose blood was repeatedly analysed at various stages of the infection. The results show that the blood sugar content of the guineapigs remained quite unaffected by the presence of this spirochaete. E. H.

BODECHTFL (G.). Sind Recurrens- und Hühnerspirochäten auf Kaltblüter übertragbar? [**Are Relapsing Fever and Fowl Spirochaetes transmissible to Cold Blooded Animals?**]—*Ztschr. f. Hyg. u. Infektionskr.* 1930. Vol. 111. No. 3. pp. 348-353. With 3 text figs. [7 refs.] [German Research Inst. for Psychiatry, Munich.]

Lizards inoculated with *S. recurrentis* showed spirochaetes in their blood 3 days later and those inoculated with fowl spirochaetes were positive to direct examination after 48 hours. Tortoises similarly inoculated never showed parasites in the circulation, but their blood was proved to contain the infection by subinoculation into other animals respectively 24 hours in the case of *S. recurrentis* and 3 days in *S. anserina*, after the tortoise had received the original inoculation. Frogs could readily be infected with both species of spirochaete, by inoculation into the dorsal lymph sac; the spirochaetes were very numerous in the blood. The blood of goldfish inoculated with *S. recurrentis* remained infective for 5 days, as tested by inoculations into mice, and the blood of those inoculated with *S. anserina* was infective after 4 days. Also the tissues of the fish, such as the heart muscle, were found to be invaded by the spirochaetes.

As the author points out, the spirochaetes merely persisted in these various cold-blooded animals for a few days and there was no evidence of their multiplication. E. H.

LEVADITI (C.) & Po (Li Yuan). Cycle évolutif du *Treponema pallidum*, du *Spirochaeta pertenuis* et du *Spirochaeta cuniculi*. [**The Developmental Cycle of *S. pallida*, *S. pertenuis* and *S. cuniculi*.**]—*C.R. Soc. Biol.* 1930. June 27. Vol. 104. No. 22. pp. 736-740. With 3 text figs. [5 refs.]

The authors have examined sections of tissues containing these spirochaetes stained by Dieterle's silver impregnation method. In all three species the organisms were found to show the same stages of development, first becoming more or less tightly coiled up into a ball, and subsequently breaking up into almost ultramicroscopic granules. These stages were found not only in lesions of the skin and mucous membranes, but also in the brain in cases of general paralysis. E. H.

MAZZA (Salvador). Espiroquetosis apendiculares. [**Appendicular Spirochaetosis.**]—*Bol. Inst. Clin. Quirúrg.* Buenos Aires. 1930. Vol. 6. Nos. 44-45. pp. 328-335. With 3 text figs. [11 refs.]

The author states very clearly the evidence regarding the pathogenicity which some observers claim for spirochaetes (*S. eurygyrata*) in the appendix.

They may be seen in the faeces of persons apparently in perfect health; others with diarrhoea, colic, and signs referable to the appendix, also excrete them and when the spirochaetes disappear after treatment, the symptoms clear up. Experiment has failed to prove that they are causative. He examined 394 excised appendices and found spirochaetes in 38 (9.60 per cent.). In 26 of them no other parasite was present; in the remaining 12 were *Blastocystis* or *Trichomonas* or both. A fairly constant accompaniment was a local fibrosis with excess of eosinophiles, intrafollicular haemorrhage, and a certain degree of atrophy of the mucosa and submucosa, but as all were cases of chronic appendicitis he sees no reason for connecting these changes aetiologically with the presence of the spirochaete. In short, since they are often present in the appendix but absent from the faeces, he concludes that there is no ground for speaking of a spirochaetal appendicitis, the condition being merely an "appendicular spirochaetosis."

H. H. S.

VASSILIADIS (P.) & JADIN (J.). Influence du *Spirochète hispanica* sur l'infection à *Trypanosome rhodesiense*. [**Influence of *S. hispanica* on *T. rhodesiense* Infection.**]—*Ann. Soc. Belge de Méd. Trop.* 1930. June 30. Vol. 10. No. 2. pp. 133-136. [8 refs.] [Bact. Lab., Univ., Louvain.]

White mice containing large numbers of *S. hispanica* in their blood were inoculated with *Trypanosoma rhodesiense*. The incubation period of the latter infection was slightly prolonged and also the death of the animal was a little delayed. Similar results were obtained in guineapigs where the incubation period was delayed three or four days at the most, and in certain cases the number of trypanosomes in the blood was reduced.

The results show that the action of *S. hispanica* on *T. rhodesiense* is very much less marked than the action of *S. duttoni* on *Trypanosoma pecaui* in which the incubation period in mice is prolonged from 2 days up to 12, or in one instance 19 days.

E. H.

YAKIMOFF (W. L.) & RASTEGAIEFF (E. F.). Die Spirochätose der Hühner im Nordkaukasus. [**Fowl Spirochaetosis in the North Caucasus.**]—*Zent. f. Bakt.* I. Abt. Orig. 1930. June 26. Vol. 117. No. 4/5. pp. 223-240. With 1 text fig. [78 refs.]

A general account of fowl spirochaetosis based on the study of a strain of the disease from Pjatigorsk. In that region the infection is transmitted by *Argas persicus*, and *Dermanyssus avium* cannot be incriminated.

The incubation period in fowls after being bitten by infected ticks is 4 to 7 days, and after blood inoculation 2 to 4 days. The appearance of spirochaetes in the blood is accompanied by an increase in the number of polymorphonuclears, which may rise from 20 to 30 per cent. up to 70 to 80 per cent. of the leucocytes. The strain of spirochaetosis at Pjatigorsk was found to be serologically identical with a Brazilian strain and also with other European strains. Pigeons were found to be resistant against both the injection of blood containing spirochaetes and the bites of infected ticks.

Various substances were tested as regards their action on the disease. In addition to atoxyl, spirocid, osarsol and arrhenal were found to be curative; sodium-bismuth citropyroborate had a slight effect; bijochinol, a bismuth iodine and quinine preparation, gave unsatisfactory results, as also albargin and ichthargan, two preparations containing silver.

Fowls were immunized by the injection of a chemotherapeutic agent at the same time as the virus, the best results being obtained by the use of atoxyl or spirocid.

E. H.

NICOLLE (Charles) & ANDERSON (Charles). Rapport sur les spirochètes des fièvres récurrentes transmises par les tiques. [**Relapsing Fever Spirochaetes transmitted by Ticks.**].—*Bruxelles-Méd.* 1930. Aug. 17. Vol. 10. No. 42. pp. 1140-1144.

A general summary containing nothing original.

E. H.

POU (R. Pino). Notes sur quelques spirochètoses humaines observées au Venezuela. [**Notes on Some Human Spirochaetoses observed in Venezuela.**].—*Rev. Sud-Américaine de Méd. et de Chirurg.* 1930. June. Vol. 1. No. 6. pp. 585-594. With 4 text figs.

A useful summary of the information on this subject.

E. H.

MARMO (Achille). Primi casi di pseudo-tubercolosi da spirochaeta bronchialis del Castellani in Eritrea.—*Ann. di Med. Nav. e Colon.* 1930. Nov.-Dec. Year 36. Vol. 2. No. 5/6. pp. 649-672. With 3 charts in text & 17 figs. on 6 plates. [2 pages of refs.]

RAYBAUD (A.). La fièvre récurrente hispano-marocaine.—*Marseille-Méd.* 1929. Dec. 15. Vol. 66. No. 35. pp. 760-776. [5 pages of refs.]

TALICE (R. V.). Trois ans de pyrétothérapie par le *Treponema hispanicum* en Uruguay.—*Rev. Sud-Américaine de Méd. et de Chirurg.* Paris. 1930. Apr. Vol. 1. No. 4. pp. 353-360. [15 refs.]

LEPTOSPIROSIS.

UHLENHUTH (P.). Zur Epidemiologie der Weilschen Krankheit mit besonderer Berücksichtigung der Wasserinfektion. [**The Epidemiology of Weil's Disease with Special Reference to Water Infection.**]—*Muench. Med. Woch.* 1930. Nov. 28 & Dec. 5. Vol. 77. Nos. 48 & 49. pp. 2047-2049; 2098-2102. [Hyg. Inst., Univ., Freiburg i.Br.]

After a general survey of the literature the author is of the opinion that the numerous cases of water infection with this disease are the result of the contamination of the water by the urine of infected rats. Consequently the rat is to be regarded as the general carrier of this disease, and the various *epidemics* at bathing establishments that have been recorded are considered to be originally due to the presence of these animals. The disease does not seem to be transmitted directly from man to man by contact, or by the agency of any insect, but is acquired either by contact with infected rats or with water contaminated by them.

Among rats the infection may be spread by direct contact from rat to rat, probably through the agency of contaminated water, and also through the ordinary water spirochaete becoming adapted for life in the body of the rat. It is also possible that some of the cases of human infection from baths may be the result of changes in the water spirochaete without the agency of rats. Further information is wanted as to the conditions under which the true pathogenic *L. icterohaemorrhagiae* can exist outside its hosts, and also the conditions causing changes in the pathogenicity of the water spirochaete and whether or not rats are necessary for such changes.

E. Hindle.

BIJL (J. P.) & KORTHOFF (G.). Ueber das Vorkommen der Weilschen Infektion in Holland während der Jahre 1924-1930. [**The Incidence of Weil's Disease in Holland during 1924-1930.**]—*Arch. f. Hyg. u. Bakt.* 1930. Oct. Vol. 105. No. 1. pp. 29-34. With 1 map in text. [Central Lab., Utrecht.]

This article supplements SCHÜFFNER'S on the same subject [this *Bulletin*, Vol. 27, p. 118]. The authors have observed 62 cases during the past six years, of which 41 occurred during August, September and October. Although the infection seemed to be usually acquired by bathing in ditches and canals, in some cases it must have been acquired from some source other than contaminated water. About 20 per cent. of the wild rats at Utrecht and Gouda were found to be infected and it seems possible that these animals are responsible for the contamination of water in the canals. In Holland, especially in the regions where canals and ditches are most abundant, there are at least 20 cases of Weil's disease every year, which can be diagnosed by the presence in the blood of the patients of agglutinins against *L. icterohaemorrhagiae*. Epidemics of jaundice may occur which are not due to this organism, but they are easily distinguished by this test.

E. H. .

FISCHER (I. A.). Over het voorkomen van de ziekte van Weil op Banka. [Weil's Disease in Banka.]—*Geneesk. Tijdschr. v. Nederl.-Indië*. 1930. Sept. 1. Vol. 70. No. 9. pp. 915-923. [12 refs.]

Four cases of Weil's disease on Banka island, two of which (in Chinese) are described. In other suspected cases the leptospira could not be found. The author quotes what is known about virus reservoirs in the Dutch East Indies. The theory of waterborne infection generally accepted in Europe is not quite established in the East. The author's own research on leptospira-carrying animals in Banka showed leptospira in 6 out of 89 specimens of *Mus rattus* (6.5 per cent.) and in 22 out of 111 of *M. decumanus* (20 per cent.). The waterside habits of the latter species probably account for the higher degree of infestation. The author found leptospira in streams polluted by drains from the market and in pools near the tin mines. Anyhow, water infection is certainly possible. Other possibilities yet exist, e.g., infection by contact with the dog, known to be a virus carrier and living in a very familiar way with the Chinese population of the island.

W. J. Bais.

TROISIER (Jean) & BOQUIEN (Yves). Spirochétose méningée d'origine hydrique. Contamination digitale. [Meningeal Spirochaetosis of Water Origin. Digital Contamination.]—*Bull. et Mém. Soc. Méd. Hôp. de Paris*. 1930. July 21 Year 46. 3rd Ser. No. 25. pp. 1298-1305. With 2 text figs. [2 refs.]

A detailed account of an interesting case of infection with *L. icterohaemorrhagiae*, in which the patient showed no signs of jaundice, but severe meningeal symptoms accompanied by herpes labialis, and marked injection of the conjunctivae. The inoculation of blood and cerebrospinal fluid into guineapigs gave negative results, but the inoculation of urine resulted in a typical and fatal attack of spirochaetal jaundice. Moreover, the patient's serum agglutinated *L. icterohaemorrhagiae* in dilutions of 1 : 30,000.

The patient was a man who washed dishes at a restaurant and was continually plunging his hands into filthy water. A fortnight before his attack he had wounded his hand, which might have facilitated the invasion of the spirochaetes. In support of this hypothesis the authors mention that there was a marked enlargement of the epitrochlear gland, which had to be removed on the eleventh day of the disease. The histological examination of this gland showed the presence of phagocytosed neutrophile polynuclears, which has been found in other cases of spirochaetosis without jaundice.

E. H.

KORTHOF (G.). Infectie met *Leptospira icterohaemorrhagiae* bij den hond. [Infection of Dogs with *L. icterohaemorrhagiae*.]—*Nederl. Tijdschr. v. Geneesk.* 1930. Aug. 16. 74th Year. 2nd Half. No. 33. pp. 4097-4103.

It was in 1916, only a year after the discovery of the *Leptospira icterohaemorrhagiae*, that UHLENHUTH and FROMME described a case of infective jaundice in a dog with leptospiras in the liver and suggested the possibility of a connexion between the disease in the dog and Weil's disease in man. OKELL, DALLING and PUGH (1925) produced positive proof by guineapig test and preparations of the kidney of the existence of infective jaundice among dogs in England. Quite recently (this *Bulletin*, Vol. 27, p. 707) KOUWENAAR and WOLFF found 6 per cent. of normal dogs in Medan, Sumatra, to be carriers of leptospiras, which,

however, they considered were not absolutely identical with those of Weil's disease. The present author has made an examination of 131 dogs by test of their sera against Weil leptospiras and by attempted culture of leptospiras from the kidney tissues. Agglutination and lysis reactions of 1 in 100 and higher were obtained in 44 out of 122 dogs but cultivation of spirochaetes was not successful. The older the dog the more certain was it that its serum would react to Weil leptospiras.

Material from dogs suspected of suffering from leptospirosis was investigated. With their sera agglutination and lysis titres to Weil leptospiras were obtained as high as 1 in 25,000 and 1 in 50,000. Guineapig tests with blood, urine, liver, or kidney were made in 9 cases with 3 positive results. These and other experiments served to raise the question whether and for how long the dog might be infective for human beings. As there is good evidence that the urine does not contain spirochaetes for much more than a week after clinical recovery, the danger of infection seems to be slight. The author comes to the conclusions that most dogs suffer sooner or later from leptospirosis, as is evident from tests of their serum, and that these infections, unlike those in rats, are of little importance for human beings because it is seldom that leptospiras are excreted in the urine.

W. F. Harvey.

FORSYTH (W. Leonard) & GOHAR (M. A.). **Leptospira in the Rat in Egypt.**—*Jl. Trop. Med. & Hyg.* 1930. July 1. Vol. 33. No. 13. p. 191. [6 refs.]

The authors examined the kidneys of 64 rats caught in the neighbourhood of Kasr el Ainy Hospital, Cairo, and found leptospira, in small numbers only, in two individuals. Guineapigs inoculated from these remained uninfected one month afterwards. Hitherto there has been no record of Weil's disease, confirmed by laboratory investigation, in Egypt, and apparently the fellaheen live in close association with the rat without danger of leptospiral infection.

E. H.

ZIMMERMANN (E.). Verbreitung und Methodik des Nachweises der *Spirochaeta icterogenes* unter wilden Ratten. [**The Distribution and Method of testing *S. icterohaemorrhagiae* in Wild Rats.**]—*Zent. f. Bakt. I. Abt.* Orig. 1930. Dec. 8. Vol. 119. No. 1/2. pp. 74-77. [13 refs.] [*Hyg. Inst., Univ., Freiburg i.Br.*]

The serum of 85 wild rats caught in Freiburg was tested for the presence of agglutinins and lysins against a "Berlin Hltd." strain of Weil's disease; 37 gave a positive reaction and 48 were negative. The kidneys of 32 serologically positive rats were inoculated into guineapigs; 24 became infected whilst 8 remained free from spirochaetes. The kidneys of 13 of the inoculated rats were tested both by inoculation into guineapigs and dark ground examination. There were 11 positive and 2 negative results from the guineapig inoculations, but 8 positive and 5 negative by microscopical examination. Fifteen serologically negative rats were also inoculated and of these two became infective to guineapigs whilst the others remained uninfected. The results indicate the high percentage of rats in Freiburg that are infected with *L. icterohaemorrhagiae*.

E. H.

HIGUCHI (Shusuke). Ueber die Verteilung der *Spirochaeta* (*Leptospira*) *icterohaemorrhagiae* im Rattenkörper und deren Ausscheidungsweg. [The Distribution of *L. icterohaemorrhagiae* in the Rat and the Manner in which they leave its Body.]—*Trans. Japan. Path. Soc.* 1930. Vol. 20. pp. 550–553. [9 refs.] [Med. Faculty, Imperial Kyushu Univ., Fukuoka.]

Rats were infected with *L. icterohaemorrhagiae* either by feeding them with the liver and kidneys of an infected guineapig, or by percutaneous or intraperitoneal inoculation. After intervals of two to ten days, rats were killed and their organs examined for spirochaetes. It was found that on the fourth and fifth day of the disease spirochaetes were present in the liver, kidney, spleen, adrenals, lungs, pancreas, heart muscle, ordinary muscle, the wall of the small intestine, and the lymph glands. They were always absent from the saliva and salivary glands. They soon disappeared from all organs except the kidney, although they persisted longer (up to 7 or 8 days) in the liver and heart muscle than in other organs. The blood was infected in 79 per cent. of the rats, and in some individuals spirochaetes were found on the 24th day of the disease. The urine first showed spirochaetes on the 4th day and, like the kidney, remained infected in each individual as long as it was under observation.

E. H.

TROISIER (Jean) & BOQUIEN (Yves). Spirochétose ictéro-hémorragique spontanée du cobaye. Contamination de cage par un porteur de germes. [Spontaneous Spirochaetal Jaundice of the Guinea-pig. Contamination of the Cage by a "Carrier."]—*C.R. Soc. Biol.* 1930. July 11. Vol. 104 No. 24. pp. 930–932. [3 refs.]

A guineapig in the authors' laboratory succumbed to typical spirochaetal jaundice without ever having been inoculated. The infection was traced to another guineapig living in the same cage which had been twice inoculated with *L. icterohaemorrhagiae* but had shown no signs of infection. However, apparently it had developed a latent infection and was passing out virulent spirochaetes in its urine eight weeks after the first inoculation and seven weeks after the second. These organisms seem to have been responsible for the infection observed and it is thought probable that they multiplied in the damp straw and that infection was produced from this contaminated material.

E. H.

DE LAVERGNE (V.), ROBERT-LÉVY & KAISER (M.). Durée d'évolution de la spirochétose ictéro-hémorragique chez le cobaye. [Duration of Weil's Disease in the Guinea-pig.]—*C.R. Soc. Biol.* 1931. Jan. 8. Vol. 105. No. 36. pp. 939–940.

Guineapigs were infected with *L. icterohaemorrhagiae* in various ways to test the influence of the method of inoculation and the dose employed. The duration of the infection was the same (8 to 9 days) in animals inoculated either intraperitoneally, subcutaneously, or by scarification, but in guineapigs infected by the ingestion of infected material the disease showed an average duration of 12 days. When the dose of spirochaetes was increased, the average duration of the infection was shortened.

E. H.

BESSEMANS (A.) & THIRY (U.). Contribution à l'étude des leptospires aquicoles. [Contribution to the Study of Water Leptospira.]—*Rev. Belge Sci. Méd.* Paris. 1930. Dec. Vol. 2. No. 10. pp. 841–856. [1 ref.] [Inst. of Hyg. & Bact., Univ., Ghent.]

A useful summary of the authors' experiments and views on this subject, based in the main on their previous publications [see this

Bulletin, Vol. 26, p. 671, and Vol. 27, pp. 125 & 706]. The comparative characters of *L. icterohaemorrhagiae* (Pettit's strain) and the authors' spontaneous mouse leptospira (SS) and of 5 strains isolated directly from various waters in Eastern Flanders are shown in the following table :—

Resemblances.	Differences.	
	Mouse leptospira (SS) and water strains.	<i>L. ictero-haemorrhagiae</i> .
Morphology in culture.	No growth in Vervoort No. 2 containing 10 per cent. bovine or human serum.	Grows freely in Vervoort No. 2 containing 10 per cent. bovine or human serum.
Staining characters.		
Development in Vervoort's medium without serum.	Abundant growth in Walker's medium.	Grows only with difficulty in Walker.
Abundant growth in Vervoort's No. 2 containing 10 per cent. rabbit serum, ascitic fluid or hydrocele fluid.	Cultures in Vervoort and rabbit serum forming a band.	No band formed in cultures in Vervoort and rabbit serum.
Filterability.	Infection in mice producing various symptoms resembling Weil's disease, and even death.	Infection in mice producing no morbid clinical manifestations.
Formation of agglutinated masses under the influence of rabbit serum.		
Subcutaneous inoculation of mice can render their urine indefinitely infected with spirochaetes which are short and slender.	Guineapig not susceptible.	Guineapig very susceptible.
Successful treatment with tartrobismuthate of K or Na.		
Non-specific agglutination.	Specific lysis by immune serum.	Specific lysis by immune serum.

E. H.

DE ARAUJO (Eduardo). Sobre amostras de leptospira insuladas de agua na Bahia. [**Strains of Leptospira isolated from Bahia Water.**—*Brasil Medico*. 1930. Dec. 13. Vol. 44. No. 50. pp. 1386-1389. English summary.]

The author has cultivated two strains of *Spirochaeta biflexa* from water samples at Bahia. One of these strains grew near the top of the culture medium, whilst the other was localized near the bottom. The spirochaetes of the latter were more active and smaller than the former. Neither of the strains was pathogenic for guineapigs.

E. H.

INOUE (S.). Beiträge zur Rieckenbergschen Reaktion. [**Studies on the Rieckenberg Reaction.**]—*Zent. f. Bakt.* I. Abt. Orig. 1930. June 3. Vol. 117. No. 1/3. pp. 80–86. [18 refs.] [Bact. Inst., Med. Faculty, Kanazawa.]

The author has studied this reaction in various strains of spirochaetes including *S. duttoni* and various leptospira. The reaction was found to take place not only at 37° C. but also at room temperature, and to reach its maximum after 20 to 30 minutes. It was found to last from 2 to 3 hours up to as long as 7 to 15 hours. It is necessary for the spirochaetes to be healthy and active as the reaction is not shown by dead organisms; blood platelets, bacteria or various fine particles may be used as indicators.

The antibodies on which this phenomenon depend are present not only in the plasma but also in the serum; they are completely destroyed by heating at 72° C. for 30 minutes. With *S. duttoni* in mice the titre of these immune bodies was 1 : 10–20, and in rabbits 1 : 60–90. An immunized mouse was found to contain antibodies for 3 to 4 months, whilst a mouse that had been injected with a dose of immune serum only showed them for 2 days. In the ice chest, serum was found to preserve its properties for more than 3 months. These antibodies may be produced by the injection of dead spirochaetes. They are capable of passing through the placenta, so that the blood of the offspring of immune animals also contains the antibodies. They were also found in the milk, but not in the urine. Six strains of leptospira were examined by serological methods, including this reaction, and found to fall into three groups: *L. icterohaemorrhagiae* including *L. icteroides*; the spirochaete of Akiyami type A; and *L. hebdomadis*, including the spirochaete of Akiyami type B.

The sera of 5 patients infected with Weil's disease gave this reaction with *L. icterohaemorrhagiae* about 7 days after the beginning of the disease and after 5 months the blood still contained these antibodies. Finally the author applied the method to the examination of wild rats and gives results showing its value in the diagnosis of infection.

E. H.

ZIMMERMANN (E.). Zur serologischen Differenzierung der Spirochäten vom Weiltyp. [**The Serological Distinction of Spirochaetes of the Weil Type.**]—*Ztschr. f. Immunitätsf. u. Experim. Therap.* 1930. Vol. 68. No. 3/4. pp. 364–374. [23 refs.] [Hyg. Inst., Univ., Freiburg i.Br.]

The author has examined various strains of leptospira, using agglutination and lysis as a means of distinction. When rabbits were used for the preparation of antisera, the resulting sera reached a high titre and were extremely specific. Guineapigs produced very much weaker and less specific antisera which gave positive reactions with a considerable number of strains. When fowls were used the resulting antisera resembled those of rabbits in their strength and specificity. By means of rabbit antisera the strains studied could be divided into two groups, the first including six strains from cases of Weil's disease, and two from rats, whilst the second included four strains, Berlin R.G.A., Krommenie, Rat strain K and 221. The first two of these strains originated from cases of Weil's disease and no explanation is given of their alteration from the original type. The Rat strain K

was isolated by SCHÜFFNER from rats in Holland, and No. 221 is the Erlangen water strain after passage through guineapigs.

In addition to the strains forming these two groups, 14 water strains were examined and found to show no serological resemblance to any of the above mentioned strains. *L. hebdomadis* was also examined and found to be distinct from all the pathogenic and water strains.

It is interesting that these experiments show that there are two distinct varieties of the "Berlin" strain, the original one maintained since 1915 at the Reichsgesundheitsamt ("Berlin R.G.A.") and this strain after having been maintained at the Tropical Institute, Amsterdam ("Berlin Hld.").

In conclusion the author expresses the opinion that the water spirochaete *L. pseudo-icterohaemorrhagiae* cannot be identified with the pathogenic form *L. icterohaemorrhagiae*.

E. H.

YANG (K.) & THEILER (Max). **The Relationship of *Leptospira icterohaemorrhagiae* and the Akiyami Type A Strain of *Leptospira* as determined by Cross Immunization Experiments in Guinea Pigs.**—*Amer. J. Trop. Med.* 1930. Nov. Vol. 10. No. 6. pp. 407-418. [5 refs.] [Harvard Med. School, Boston.]

The authors have made a careful series of cross immunity tests with a strain of *L. hebdomadis* known as Akiyami Type A and a strain of *L. icterohaemorrhagiae* originally isolated from rats in Boston. The virulence was maintained by passage in young guineapigs and to avoid any possible contamination the two strains of leptospira were kept in separate rooms and two different individuals looked after them.

The results clearly indicate that guineapigs actively immunized against the Boston strain of *L. icterohaemorrhagiae* are immune against the Akiyami Type A strain; also guineapigs actively immunized against the latter are immune against the Boston rat strain. These two strains are thus shown to be indistinguishable by cross immunity tests and would seem to be the same species. In view of these results the authors raise the question as to whether it is warrantable to create a new strain just because there is some difference in the potency of the immune serum, as shown, for example, by the agglutination test. The whole subject of leptospira is becoming exceedingly involved and complex, largely due to this establishment of a number of different "species" on insufficient grounds.

E. H.

DINGER (J. E.) & VERSCHAFFELT (Françoise). **Recherches expérimentales sur quelques souches de leptospires. [An Experimental Investigation of Various Strains of *Leptospira*.]**—*Ann. Inst. Pasteur.* 1930. Sept. Vol. 45. No. 3. pp. 396-414. With 2 text figs. [10 refs.]

The authors obtained from BESSEMANS the Ghent water strain of leptospira which he and THIRY (this *Bulletin*, Vol. 26, p. 671; Vol. 27, pp. 125 and 706) had found to be pathogenic in mice. This strain was inoculated into mice at Amsterdam, but the spirochaetes never produced any infection and disappeared from the body cavity within a few hours. Moreover, they never appeared in the urine. Serologically it was found to be related to various other water strains. The authors then obtained from Dr. BESSEMANS four infected mice and these showed leptospira in the urine. Attempts to infect Amsterdam mice by the

inoculation of this urine or an emulsion of an infected kidney gave negative results. When an infected kidney was cultured in Vervoot's medium and then inoculated the Amsterdam mice became infected and showed leptospira in the urine and in rare instances also in the blood. This strain of leptospira termed "Muis Gent" was transmitted from mouse to mouse by the inoculation of blood or peritoneal exudate or cultures of the kidney. By repeated passages in guineapigs this strain gradually became virulent to these animals, but its virulence was not altered towards mice. The serological characters of the strain remained constant; it was quite distinct from various strains of *L. icterohaemorrhagiae* and also from the Ghent water strain.

Mice were then infected with a strain of *L. icterohaemorrhagiae*, and several passages made in these animals, but the serological characters remained unchanged.

Finally, the authors studied a "Slime Fever" strain that had been isolated from a human case of this disease by TERSKICH, during an epidemic in Moscow. This strain in its general growth in culture was found to resemble the water forms, but was pathogenic to guineapigs. Yet passage through these animals did not augment its virulence, and the liver contained so few organisms that they were never detected by microscopical examination. They persisted in the body cavity of mice for two days but never appeared in the urine. Serologically this slime fever strain was found to be quite distinct from all other pathogenic and saprophytic strains. It is less pathogenic than that of Weil's disease, and according to its reactions should be regarded as a distinct infection.

[This interesting paper contains the first record of a human strain of leptospira in Europe differing from the typical Weil strain both in its serological characters and in the symptoms that it produces.]

E. H.

DE ARAUJO (Eduardo). Verificações experimentaes com amostras de leptospira saprophytas. [**Experiments with Various Strains of Saprophytic Leptospira.**].—*Brasil-Médico*. 1930. Dec. 20. Vol. 44. No. 51 pp. 1407-1411. English summary.

The author has made experiments to see if the leptospira recorded from yellow fever patients by NOGUCHI and others is an associated micro-organism, secondary invader, or *virus de sortie*. Young guineapigs were inoculated with yellow fever virus and either simultaneously or later also inoculated with various cultures of water leptospira. The blood of these guineapigs was cultured at various intervals, but in no case were leptospira recovered; consequently the author concludes that yellow fever virus has no effect on the pathogenicity of these spirochaetes. It seems probable that before the susceptibility of monkeys was discovered cases of Weil's disease were confused with yellow fever.

E. H.

RIDLON (J. R.). **Studies on *Leptospira icterohaemorrhagiae*.**—*Public Health Rep.* 1931. Jan. 2. Vol. 46. No. 1. pp. 1-5. [13 refs.]

The author examined 50 wild rats (*norvegicus*) caught in the neighbourhood of San Francisco, and by dark ground examination of the kidneys found 17 of them infected with *L. icterohaemorrhagiae*, this diagnosis being confirmed by the infection of guineapigs, which died with typical symptoms.

E. H.

SEMZOVA (O. M.). Zur Frage der Epidemiologie des infektiösen Ikterus. II. Untersuchung der Gewässer Moskaus auf *Spir. icterogenes*. [**Epidemiology of Infectious Jaundice. II. Examination of Moscow Water for *L. icterohaemorrhagiae*.**]—*Zent. f. Bakt. I. Abt. Orig.* 1930. Aug. 28. Vol. 118. No. 1/2. pp. 12–15. [6 refs.] [Microbiol. Research Inst., Education Commissariat R.S.F.S.R., Moscow.]

The author found water leptospira and also spirochaetes of the type of *S. recurrentis*, *S. pallida* and *S. plicatilis* in the water of the river Moskwa. No water leptospira was found in the Jausa, a tributary of the Moskwa, nor in any of the ponds of Moscow.

E. H.

RAT-BITE FEVER.

M'CLUSKIE (J. A. W.). *Spirillum minus* derived from a Spontaneous Infection in the Mouse—with Special Reference to Pathogenicity as a Means of Differentiating it from Strains in the Rat.—*Jl. Path. & Bact.* 1930. Oct. Vol. 33. No. 4. pp. 863–869. With 5 figs. on 1 plate. [18 refs.] [Path. Dept., Univ., & Western Infirmary, Glasgow.]

The author in the course of work with trypanosomes found a mouse infected with *Spirillum minus*. Other mice were easily infected by the inoculation of infected blood, the spirilla usually appearing in the circulation 3 to 6 days later and reaching their maximum in 7 to 12 days. The infection may persist indefinitely; splenectomy in 3 mice had no appreciable effect.

The natural transmission of this infection is very obscure, for male and female mice were kept in jars with infected individuals of the opposite sex without ever showing any signs of the disease or developing any immunity. Moreover, the offspring of infected individuals were normally susceptible, although the mice born of infected parents seemed to remain small and died sooner than controls born at the same time. 18 guineapigs were inoculated with blood from infected mice and in addition 3 human subjects, but none of them showed any signs of infection. This strain of mouse spirillum differs, therefore, from that described by SCHOCKAERT (see this *Bulletin*, Vol. 25, p. 600) which was pathogenic for man.

E. Hindle.

ROBERTSON (Andrew). *Spirillum minus* Carter, 1887, the Aetiological Agent of Rat-Bite Fever: a Review.—*Ann. Trop. Med. & Parasit.* 1930. Oct. 22. Vol. 24. No. 3. pp. 367–410. With 1 chart in text & 1 plate. [11 pages of refs.]

A comprehensive survey, containing an excellent account of previous work as well as the present state of our knowledge.

E. H.

SCHOCKAERT (Jos.). Antimontherapie im Rattenbissfieber. [**Antimony Treatment in Rat-Bite Fever.**]—*Deut. Med. Woch.* 1931. Jan. 16. Vol. 57. No. 3. pp. 103–104. [16 refs.] [Bact. Inst., Univ., Löwen.]

The author shows that whilst tartar emetic, stibenyl and antimosan have no obvious effect on the spirillum of this disease, stibosan has a distinct action. It is curious that stibenyl, which contains more antimony, is less toxic, and is also similar in chemical composition to stibosan, should differ so markedly in its therapeutic value in this infection. Although the spirilla as a general rule do not disappear for some days after treatment, this is also the case when arsenical compounds are used, and the author recommends the use of stibosan for the treatment of both rat-bite fever and relapsing fever, especially when there is any suggestion of these infections being arsenic-resistant.

E. H.

PREYER (Giovanna). Su tre casi di sodoku riscontrati in Roma. [**Three Cases of Rat-Bite Fever in Rome.**]—*Ann. di Med. Nav. e Colon.* 1930. Jan.-Feb. Year 36. Vol. 1. No. 1/2. pp. 10-22. With 1 text fig. [24 refs.] [Inst. of Clin. Med., Univ., Rome.]

The three cases described were typical except in the character of the temperature. The first, after an incubation period of 8 days, suffered from repeated attacks of fever lasting for two days with apyrexial intervals of 36 hours or thereabouts; the second, after an incubation period of 20 days, had febrile attacks lasting for 2, 3, or 4 days with afebrile intervals of 10-15 days; the third, after 10 days' incubation, presented an irregular fever for two days at a time with 2, 3, or 4 days apyrexia. The diagnosis was made on the history and clinical findings. On one occasion only was the spirillum found.

H. H. S.

ANGUERA (A.). Estudio clinico y experimental de la fiebre sodoku (*Spirochete morsus muris*) en España. [**Clinical and Experimental Study of Rat-Bite Fever.**]—*Medicina Países Cálidos.* Madrid. 1930. Jan. Vol. 3. No. 1. pp. 1-30. With 2 figs. & 3 charts in text. [145 refs.] French summary (4 lines).

The author describes two cases. The first was a man of 42 years, bitten on the hand by a rat. Fifteen days later he suddenly exhibited nervousness and tremor of arms and legs. Two days afterwards he shivered and the next day was violently delirious. After three days' fever the temperature fell, to rise again 48 hours later. This cycle was repeated for a month, the temperature being 41° C. in the first, 38.5°-39.7° C. in the subsequent attacks. A lymphangitis, adenitis, and a generalized macular rash were present. Neosalvarsan, 0.15 gm., injected once intravenously resulted in cure. Examination of blood smears was negative, but blood injected into guineapigs gave rise to infection and the spirillum was found, not in the animal's blood, but in the glands and organs.

The second case was a child of 7 years bitten on the nose. The wound healed, and the first symptoms declared themselves nine weeks later—local inflammation, generalized rash and attacks of fever lasting three days with apyrexial intervals of 3-4 days. This also cleared up with neosalvarsan, but three injections of 0.15, 0.3, and 0.45 gm. at five-day intervals were needed. Similar inoculation experiments were made as in the last case to determine the diagnosis. Neither patient had any complications.

H. H. S.

ANGUERA (A.). Le premier cas de sodoku en Guipuzcoa (Espagne). [**The First Case of Sodoku in Guipuzcoa (Spain).**]—*Bull. Soc. Path. Exot.* 1930. Mar. 12. Vol. 23. No. 3. pp. 266-267.

The record of a typical case of this disease. The spirillum was found in the lymphatic glands of guineapigs inoculated with the patient's blood. Although this seems to be the first record in Spain of the causative organism being found, the disease has been known since 1885 when PENA Y MAYA described a case.

E. H.

ADCOCK (E. W.). **Two Cases of Rat-Bite Fever.** [Correspondence.]—*West African Med. J.* 1929. Oct. Vol. 3. No. 2. p. 48.

A record of three cases of rat-bite fever in Warri, Nigeria. Two in which spirilla were found were each successfully cured by two intravenous injections of 0.3 gm. novarsenobenzol at a week's interval.

E. H.

MOCHTAR (A.). Een geval van rattebeetziekte (Sodoku). [**A Case of Rat-Bite Fever.**]—*Geneesk. Tijdschr. v. Nederl.-Indië*. 1930. Mar. 1. Vol. 70. No. 3. pp. 252-259. With 1 chart. [11 refs.]

A typical case in a native woman of 50 bitten in the hand by a rat. A guineapig and two mice were infected with the spirillum by inoculation of the patient's blood, 1, 2 and 3 days after the height of a febrile attack. If no mice are to be obtained guineapigs may serve as experimental animals, but must be injected with larger quantities (5 cc.) of the patient's blood. Two arsphenamin injections of 0.45 gm. each cured the condition.

W. J. Bais.

MURUGIAH (C.). **A Case of Rat Bite Fever.**—*Malayan Med. Jl.* 1930. June. Vol. 5. No. 2. p. 76. With 2 plates. [4 refs.]

——. **A Case of Rat Bite Fever.**—*Ibid.* Dec. Vol. 5. No. 4. pp. 149-150. [1 ref.]

The record of two cases of this disease. In both the symptoms were typical, and in the second case, although spirilla were not found by microscopical examination, the inoculation of fluid from the site of the wound into a guineapig resulted in infection with *Spirillum minus*.

E. H.

LEPROSY.

MAYER (T. F. G.). **Report of the Nigerian Branch, British Empire Leprosy Relief Association, 1929.**—*Ann. Med. & San. Rep. Nigeria*, 1929. Appendix H. pp. 95-99.

The printing of this report twice over on consecutive but differently numbered pages is presumably a printer's error rather than an emphasis of its importance. The 25 treatment centres in Nigeria in 1928 were increased in 1929 to 51, and the lepers under regular treatment rose from 2,975 to 3,630; an increasing number of these are early cases favourable for treatment; 124,400 doses were used at these centres alone, hydnocarpus oil and alepol being given, and literature on the treatment was distributed. [A recent letter from Dr. Mayer to the reviewer states that there are now some 6,000 lepers under treatment, all on a purely voluntary basis.]

L. Rogers.

MAYER (T. F. G.). **The Distribution of Leprosy in Nigeria with Special Reference to the Aetiological Factors on which it depends.**—*West African Med. Jl.* Lagos. 1930. July & Oct. Vol. 4 Nos. 1 & 2. pp. 11-15; 23-31. With 10 maps. [24 refs.]

This is a long but interesting paper by the whole time leprosy medical officer of Nigeria, illustrated by ten maps. The information was collected by personal tours and by replies to a questionnaire. The highest rates occur in the southern wet zone, and the least in a central elevated area. The present distribution is considered to have been influenced by the former slave trading and by previous immigration movements. Native methods of prophylaxis also had a powerful influence, and the rarity of the disease in the Yoruba area is attributed to the primitive custom of killing leper children and driving older ones into the bush, and to the isolation of lepers in other areas. In the badly affected Mohammedan areas of the north, on the other hand, there is no fear of the disease or precaution against infection. The low rate in the elevated central area is attributed to isolation from other areas and to less debilitating malaria. Famines kill off many lepers, and the Mohammedan fast causes predisposing debility, as does deficient diet in some areas, want of cleanliness, the prevalence of yaws and syphilis, sexual promiscuity, and helminthic infections.

L. R.

PANETH (O.). **Ueber Leprabekämpfung in Niederländisch-Indien. [Leprosy Control in Dutch East Indies.]**—*Seuchenbekämpfung*. Vienna. 1930. Vol. 7. No. 2. pp. 139-146. With 5 text figs.

The author discusses the leprosy problem in the Dutch East Indies and points out that wholesale compulsory segregation of the lepers in the scattered islands is quite impracticable geographically and financially, since they must number over 25,000; the problem is a very difficult one. He goes on to describe the leper asylum at Lau Si Momo in a good climate, where the inmates live a natural life and leper patients are allowed to marry; children are few, and after being weaned they are sent to healthy relatives. The patients build native huts and cultivate crops, half of which remain their own property.

Difficulties arise in getting lightly affected patients to reside with advanced ones in the institution, but the Norway system of home isolation is not practicable in these backward people. He concludes by advising compulsory segregation where practicable under comfortable conditions which will make the patients willing to remain, and also separate establishments for ambulatory and early cases, with the provision of hygienic forms of work. L. R.

HIROSE (Y.). Statistische Beobachtungen ueber die Leprakranken während der vergangenen 20 Jahre. (Ueber die Lepra auf der Insel Kyushu. 6. Mitteilung.) [**Leprosy on the Island of Kyushu, Japan.**—*Japan. Jl. Dermat. & Urol.* 1930. Nov. Vol. 30. No. 11. pp. 1138–1161. [10 refs.] [In Japanese. German summary. pp. 120–121.] [Dermat. Urol. Clinic, Imperial Univ., Kyushu.]

The author records that in his skin clinic during twenty years he has seen 3,487 lepers (3.9 per cent. of the total patients), of whom 54.3 per cent. were macular cases, 6.9 nodular, 15.0 nerve and 19.8 of the mixed type. Men numbered 2,465 and women 653. The macular type has shown a steady increase and the nerve type a decrease. There was an important increase of the disease from the age of puberty, especially from 21 to 25 years of age, while the females showed a small increase at 50 to 55 years of age. Peasants from the country suffered most, and many patients admitted that their fathers suffered from the same disease. L. R.

NEFF (E. A.). **Report on the Central Leper Hospital, Makogai.**—*Fiji Ann. Med. & Health Rep. for Year 1929.* pp. 48–59. With 9 figs. on 6 plates & 1 diagram.

The report opens by recording that "the optimism, previously recorded as prevailing amongst patients and staff, continued during 1929." A hurricane did much damage in December and stripped the fruit from the young *H. wightiana* trees, but they fortunately survived. The admissions numbered 88, 30 died, 5 were discharged as not lepers, and 20 on parole as recovered. Indian patients are accumulating, since they now refuse repatriation, and they are more affected than Fijians. At the end of the year the total inmates numbered 442, and 373 received regular treatment. Dr. Neff states "I strongly favour the sodium salts," including alepol, but esters were also used, often alternately with sodium gynocardate. The esters of the local *Ol. Calophyllum Bigator* continued to prove of value in relieving nerve pains. Good illustrations of the leper colony and of improvement under treatment are given. L. R.

WELDON (S. G.). **Makogai : the Central Hospital for Leprosy in the Western Pacific.**—*Jl. Roy. Nav. Med. Serv.* 1930. Oct. Vol. 16. No. 4. pp. 264–269. With 3 text figs. [2 refs.]

This is a brief account of a visit by a naval surgeon to the Fiji leper settlement at Makogai with very similar information to that in Dr. NEFF's report above. It includes some striking photos of patients before and after treatment. L. R.

DE VERA (Bonifacio). **Morbidity and Mortality among the Nonleper Children in the Cullion Leper Colony.**—*Jl. Philippine Islands Med. Assoc.* 1930. Nov. Vol. 10. No. 11. pp. 457-469. [9 refs.]

This inquiry has shown that leprosy incidence was much higher from 1922 to 1926 than from 1927 to 1929 since the children have regularly been removed from contact with their parents at a progressively younger age. The infant mortality has also fallen greatly with improved medical care. Infantile beriberi disappeared since vitamin B was added to the diet. Since 1928 no new case of leprosy has been reported among the children born in the colony.

L. R.

COPANARIS (Ph.). La lèpre en Grèce. [**Leprosy in Greece.**]—*Bull. Office Internat. d'Hyg. Publique.* 1930. Nov. Vol. 22. No. 11. pp. 2131-2134.

Leprosy has been known in Greece since the days of Hippocrates and is now prevalent in isolated centres on the coast and on islands, especially Crete, but the exact number is not known. The formation of leprosaria in Crete and Samos is said to have reduced its prevalence. During the last four years inquiries have localized the disease as described in detail in this paper and 426 lepers are now isolated, mostly at Spinalonga, Crete, and from 50 to 100 probably remain free. Alepol is being used in treatment and the results are "très satisfaisants."

L. R.

KLÖVEKORN (G. H.). Der Aussatz im Rheinland. [**Leprosy in Rhineland.**]—*Strahlentherapie.* 1930. Jan. 9. Vol. 35. No. 1. pp. 172-181. [Skin Clinic, Univ., Bonn.]

After references to the early history of leprosy and to the drastic forms of segregation practised in the middle ages, the author enumerates some of the leper institutions in Rhineland from 1162 to 1492. The largest of these was at Melaten near Cologne. Here lepers were kept for a lifetime and were allowed to beg money towards their upkeep, and in Cologne two brotherhoods collected provisions for the lepers, and suspected cases were sent there for examination. Some of these institutions were rich, and at times tramps shammed leprosy to gain admittance. Many nurses were provided and the foundation of the Order of Lazarus is described, while the constitution and domestic arrangements were on a democratic basis. The well-known middle ages precautions to prevent lepers from coming into contact with the healthy are next described. Since 1700 the Melaten leprosarium has been converted into a prison or workhouse, as scarcely a single case of leprosy remained, and he attributes the absence of the disease to the rigid precautions of the middle ages. He therefore advocates the provision of lupus homes to deal with that deforming disease.

L. R.

DENNEY (O. E.). **The National Leper Home (United States Marine Hospital), Carville, La. Review of the more Important Activities during the Fiscal Year ended June 30, 1930.**—*Public Health Rep.* 1931. Jan. 2. Vol. 46. No. 1. pp. 5–12. With 4 figs. on 2 plates.

This report deals with the work at Carville up to June 1930, and records that 55 new patients were admitted, 22 died, 23 were paroled with leprosy arrested and 8 more were qualified for parole, but elected to stay on because of disfigurement. Twenty patients were treated experimentally with vaccinated calf serum, and all but one improved. Mercurochrome with glucose intravenously has given good results in a few cases, high-frequency fulguration was of value in the removal of discrete nodules. Hot boracic compresses are used for ulcers. Vitamins are of value.

L. R.

LEPROSY REVIEW. 1930. Oct. Vol. 1. No. 4. 32 pp.

——. 1931. Jan. Vol. 2. No. 1. 38 pp. With 6 figs. (1 map) on 4 plates. Quarterly Publication of the British Empire Leprosy Relief Association, 29 Dorset Square, London, N.W.1.

In the October number E. MUIR deals with the early diagnosis of leprosy, and records that he had found Botelho's serological test for leprosy of little value. Reliance must therefore be placed on clinical methods, which enabled 61 per cent. of 929 cases seen in Calcutta in one year to be diagnosed as leprosy in spite of negative bacteriological examinations. Again 159, or 0.94 per cent. of 16,889 coolies examined in Calcutta, showed definite signs of leprosy, 72 per cent. of which were diagnosed on clinical grounds. Such bacteriologically negative cases can be treated at small cost with good results at clinics as not being infective: almost 100 per cent. of them can be cured by thorough treatment with disappearance of all signs for a period of years. Early cases of leprosy are much easier to diagnose than tubercular cases. ROGERS contributes a brief note on the intradermal leprolin test for the detection of early and latent cases; this is based on papers already reviewed in this *Bulletin*. A trial in Nauru Island has been arranged. Other papers deal with the examination of nasal smears, the treatment of common skin diseases complicating leprosy, and on the employment of lepers while under treatment, all subjects of practical importance to the practising leprologist.

In the January issue J. L. MAXWELL points out the danger of the spread of leprosy in Manchuria as the result of infection through immigration of some three million people from infected provinces of China in the last three years, for the annual number of lepers seen at the Mukden Mission Medical College is now tenfold that of a few years ago. A leprosy survey is urged. F. H. COOKE deals with and illustrates the Ho Leper Settlement in the Gold Coast which he founded; the number of lepers in this has increased from 4 or 5 in 1926 to 436 in 1930, all of whom have come voluntarily for the sake of treatment. Farming is carried on by the inmates and it is hoped that in future the settlement will be more or less self-supporting. A. KERR reports that Siam contains sufficient *H. anthelmintica* trees, locally known as "krabao," to supply oil for the treatment of a very large proportion of the lepers of the world. Janet MURRAY reports the establishment

of a leprosy clinic in northern Tanganyika Territory to attract lepers, "most of whom never showed themselves for fear of compulsory segregation." The numbers increased in one year from 4 to over 100, so other clinics were opened which hundreds attend each week, including many early cases; these the African is able to recognize. Alepol injections and trichloracetic acid locally is the routine treatment. The author concludes: "We are gradually learning that if we want to rid East Africa of leprosy there must be no compulsory segregation." B. MOISER contributes a practical paper on growing food and vegetables for leper patients, and R. G. COCHRANE begins a review of the leprosy problem in East and Central Africa, based on information collected during his 1930 tour, with an account of the Anglo-Egyptian Sudan, where a remarkable effort is being made by the medical authorities to stamp leprosy out of the badly infected humid southern districts; here over 5,000 lepers are now being treated in colonies and settlements, and are expected to become self-supporting as regards food within a short time. S. BJARNHJEDINSSON contributes an interesting article on leprosy in Iceland, where a humane system of isolation was introduced by EHLERS in 1896, since when the number has fallen from 250 to 37. Ol. chaulmoogra orally, ethyl esters and hydnocarpates have been used since 1907 and "the improvement in the condition of the patients was enormous." I. SANTRA deals with the leprosy campaign in India, and reports that about 1,000 doctors have been trained in Calcutta and elsewhere in modern treatment, and following surveys 12,000 lepers are being treated in clinics in Bihar and Orissa and Madras alone. MUIR deals with treatment of residual leprosy.

L. R.

VEDDER (E. B.). **A Discussion of the Evidence concerning the Transmission of Leprosy.**—*Porto Rico J. of Public Health & Trop. Med.* 1930. Sept. Vol. 6. No. 1. pp. 106-121. [23 refs.]

This paper contains an interesting statement of the usual arguments for and against leprosy being contracted by (1) Contagion, (2) Insect transmission, and (3) Soil infection, as recently suggested by WALKER, whose bacteriological work lacks confirmation. The inevitable conclusion is arrived at that there is no scientific proof of either view, so further experimental research is required.

L. R.

- i. GOUGEROT & AUBIN. Elimination du bacille de Hansen par la muqueuse nasale macroscopiquement "saine." [**Elimination of Leprosy Bacilli by the Apparently Healthy Nasal Mucosa.**]—*Bull. Soc. Française Dermat. et Syph.* 1930. Nov. No. 8. pp. 1154-1155.
- ii. JEANSELME. A propos de la communication de MM. Gougerot et Aubin sur l'élimination du bacille de Hansen par la muqueuse nasale macroscopiquement "saine."—*Ibid.* 1930. Dec. No. 9. pp. 1272-1273. [1 ref.]

i. A short note emphasizing that it is necessary to scrape the nasal mucosa, and not simply to rub it, when examining for the presence of leprosy bacilli, which may thus be sometimes found even when no lesions of the nasal mucous membrane are visible.

ii. The author agrees with the above statement, and he points out that he laid stress on the point in his first paper of 1897, when he introduced this method of examination.

L. R.

CAMPOS (Nelson de Souza). A bacillema na lepra. [**Bacillaemia in Leprosy.**]—*Brasil-Médico*. 1930. Sept. 27. Vol. 44. No. 39. pp. 1093-1097.

The author has examined, after staining by the Ziehl-Neelsen method, smears of blood made from pricking the thumb or finger of lepers (avoiding, of course, local lesions). Of 14 cases of nodular leprosy he found bacilli in 12; the other two were doubtful, by which term he implies the presence of non-acid-fast bacillary fragments. Among 42 with mixed leprosy there were 31 positive, 9 negative, 2 doubtful; of 40 maculo-anaesthetic 12 positive, 24 negative, 4 doubtful; all of 4 nervous type were negative. The high proportion of positives among the nodular and mixed calls for measures to safeguard against blood-sucking insects.

H. H. S.

LE ROUX (J. J. du Pre). **The More Important Clinical Features of Leprosy.**—*Jl. Med. Assoc. South Africa*. 1930. Dec. 13. Vol. 4. No. 23. pp. 715-720. With 6 text figs.

The common lesions of early and moderately advanced leprosy are described and illustrated by photos. Treatment is also discussed, and in view of earlier scepticism regarding its value in South Africa it is of interest to note the author's statement that:

"The results of treatment at the Pretoria Leper Institution compare favourably with those obtained in most other countries where institutional treatment is resorted to. . . . One hundred and twenty-eight patients, constituting more than 14 per cent. of the inmates, were probationally discharged as 'arrested' cases in March, 1930. Of these 50 per cent. were entirely 'symptom-free,' i.e., without mutilations or deformities or any disabilities."

He refers to the prejudice against diagnosing the early stages of the disease as leprosy on account of the "traditional stigma" due to "the amalgamation of ignorance, tradition and journalism into an unholy pact" so that "no medical man will be prepared to condemn a member of that same public to ostracism until he is perfectly sure of his diagnosis, and probably until he has seriously precluded his patient's chance of recovery." As this very early stage affords "the optimum results from treatment, it is indeed a pity that public opinion should withhold these benefits from its victims. To cure the public of its leprophobia, and thus rob tradition of its pound of flesh, appears to me the only possible solution to this question." For this purpose he suggests "an extremely audacious subterfuge," namely to call the early stages of leprosy by some name "not even remotely resembling or suggestive of leprosy." The patients could then be treated at home without segregation, while the more advanced infective cases are isolated as at present.

L. R.

BALIÑA (Pedro L.). Sobre seis casos clínicos de lepra. [**Six Cases of Leprosy.**]—*Semana Méd.* 1930. Sept. 11. Vol. 37. No. 37 (1913). pp. 777-786. With 3 text figs. [Faculty of Med. Sciences, Buenos Aires.]

The details of six patients are presented, mainly from the clinical aspect. The first was an Italian woman, 55 years of age, with maculae of arms, legs and face. In spite of the failure to find acid-fast bacilli in the nasal mucus and the W.R. being negative, owing to the anaesthetic character of the lesions a diagnosis of combined leprosy and syphilis was made and treatment by chaulmoogrol esters and arsenic gave good results. The second patient was a woman of 28 with maculo-anaesthetic leprosy whose father had suffered from the ulcerating nodular type, but had left the place eight years previously. The third, a man of 25, suffered from a very intractable prurigo, but had also a solitary anaesthetic macula on the right buttock. The fourth is of special interest: a woman of 20 with widespread macular leprosy. After a series of 35 injections of chaulmoogra, 5-10 cc. of the ethyl esters per dose, she had a severe attack of pneumonia. The leprosy patches cleared so rapidly thereafter that it is believed that the acute febrile condition played no small part. The fifth, a man of 23, showed an enormous number of telangiectases on face, ears, upper part of the thorax, both arms and legs, with anaesthesia, W.R. strongly positive and Hansen's bacilli in the nasal mucus. Mixed treatment for leprosy and syphilis brought about great improvement. The sixth was a case of trophic ulcer of the foot.

H. H. S.

TISSEUIL (J.). Lèpre tuberculoïde primitive en Nouvelle-Calédonie. [**Primary Tuberculoid Leprosy in New Caledonia.**]—*Bull. Soc. Path. Exot.* 1930. Oct. 8. Vol. 23. No. 8. pp. 772-777. [Gaston Bourret Inst., Nouméa, New Caledonia.]

This paper contains a brief description of the appearances in eight patients out of 19 of these well-known leprosy lesions among 117 cases examined in New Caledonia, where this type appears to be common. The lesions contained numerous lepra bacilli.

L. R.

TISSEUIL (J.). Splénomégalies sub-aiguës de la lèpre. [**Subacute Splenomegaly in Leprosy.**]—*Bull. Soc. Path. Exot.* 1930. Nov. 12. Vol. 23. No. 9. pp. 911-913. [Gaston Bourret Inst., Nouméa.]

A brief paper in which notes are recorded of four lepers in whom some increase was noted in the size of the spleen accompanying variable, and often slight, elevations of temperature, with weakness and anaemia. The organ diminished again under general treatment with iron.

L. R.

TISSEUIL (J.). Sur un cas de lèpre ganglionnaire. [**A Case of Glandular Leprosy.**]—*Bull. Soc. Path. Exot.* 1930. July 9. Vol. 23. No. 7. pp. 692-693. [Gaston Bourret Inst., Nouméa.]

In the examination of the family of a female leper her mother, who showed no skin symptoms of leprosy, was found to have a few acid-fast bacilli in an inguinal gland as revealed by puncture.

L. R.

DENNEY (Oswald E.), HOPKINS (Ralph) & JOHANSEN (Frederick A.). **Scleroderma-like Lesions in Lepers.**—*Southern Med. J.* 1930. Nov. Vol. 23. No. 11. pp. 1003-1006. With 6 text figs.

This is an illustrated article describing scleroderma-like lesions occurring in leprosy only on legs and hands, of large size and irregular shape, but with no appreciable elevation or central clearing. They are from bright red to brown with varying degrees of pigmentation and are extremely hard. They are almost completely anaesthetic, of very long duration; they were found in 41 per cent. of 302 patients examined, and may contain lepra bacilli when these are found in other skin lesions.

L. R.

ADROGUÉ (Esteban) & SENA (José A.). Lesiones oculares en un caso de lepra a forma nerviosa [**Ocular Lesions in a Case of Nervous Leprosy.**].—*Semana Méd.* 1931. Jan 1. Vol. 38. No. 1 (1929). pp. 16-19. With 3 text figs.

The patient, now aged 34, a native of Almería (Spain), went to America at the age of 11, and to the Argentine 4 years later. When 23 years old he began to develop numbness, neuralgic pains and itching of the feet, and maculae appeared on the legs. Improvement followed the use of chaulmoogra but this had to be stopped owing to intolerance. Seven to eight years after the first symptoms disturbances of vision began; these were lachrymation and inability to close the lids (other facial muscles, especially of the lips, were paretic), and when examined by the authors recently, 3-4 years after the eye symptoms started, there were superficial losses of substance of the cornea and fundus changes in the right eye, a choroido-retinitis with pigmentation and visual defects capable of rectification to one-half. Vision in the left eye was half, but could be brought to normal by the use of lenses; the left fundus showed no change.

H. H. S.

TAKINO (Masuichi). Die pathologischen Veränderungen der Hautnerven bei Lepra. [**Pathological Changes in the Skin Nerves in Leprosy.**].—*Acta Scholae Med. Univ. Imperialis in Kioto.* 1930. Vol. 13. No. 1. pp. 1-15. With 2 coloured figs. on 1 plate. [Path. Inst., Japan. Imperial Univ., Kyoto.]

The author reports a careful histological study of the changes produced in the nerves of the skin in leprosy, and also what he regards as a hitherto undescribed normal nerve termination in the human hair. He concludes that the falling out of the hair in leprosy is due to degeneration of the nerves of the hairs through the development in them of leprous globi, mostly in the external rootsheaths. The degeneration of the nerves of the skin is a primary one due to leprous infiltration of the tissues. This is largely brought about by the formation of leprous globi between the nerve fibres, along single nerve fibres and also within the medullary sheaths, and even within the axis-cylinders themselves as demonstrated by him, for he has frequently found both medullary sheaths and axis-cylinders within leprous cell infiltrations, so the nerve degenerations stand in close relationship to the formation of the large-celled leprous globi.

L. R.

DWIJKOFF (P. P.). Zur Frage der pathologischen Anatomie und der Pathogenese der Lepra. [**The Pathogeny of Leprosy.**]—*Frankfurter Ztschr. f. Pathologie*. 1930. Vol. 40. No. 2. pp. 185–209. With 2 text figs. [30 refs.] [“Elias Metschnikow” Inst. for Infectious Diseases, Moscow.]

Histological examinations have been made of the tissues of a pauper leper who died of gangrene of the foot, while suffering from mixed leprosy, and who received no treatment for his leprosy. The conclusion is come to that the lymphatic system is mainly affected by the leprosy process, which starts in the reticulo-endothelial system, and the superficial lymph glands are specially affected in addition to the skin. Scattered groups of lepra bacilli may also be found in the internal organs, such as the liver, as shown in an illustration.

L. R.

LARA (C. B.). **Progress of Leprosy Treatment at the Culion Leper Colony.**—*Jl. Philippine Islands Med. Assoc.* 1930. Nov. Vol. 10. No. 11. pp. 469–480. [35 refs.]

The author points out that a statement of six years ago, that with few exceptions a leper sent to Culion never returned, is not now true, and he gives data to show that the recoveries are as numerous among the advanced Culion cases as in the newer regional treatment stations, and they should be still better under the present modified system of segregation. Since 1921 about 80 per cent. of 8,520 Culion cases have been treated intensively, chiefly with iodized ethyl esters. In recent years a better diet has improved the nutrition of the patients and helped treatment, and the routine injections are now given by nurses, which saves the time of the physicians. Between 1922 and 1929 1,355 patients have been paroled or discharged as negative bacteriologically for from 6 to 24 months, or 19·6 per cent. of all the treated cases, while 480 more negative cases were awaiting their discharge, making a total of 27·1 per cent. of the whole number, or 30 per cent. if all cases found to be negative once are included. Yet from 1906 to 1921 only 47 negative cases were released under former treatments, 46 of these having been under the Mercado method. The available records of the San Lazaro Hospital, Manila, shows 19 per cent. paroled and 25·8 per cent. negative at least once out of 1,576 treated, and HASELTINE's data on Hawaii cases from 1918 to 1921 would represent 19·7 per cent. paroled, while WILSON in Korea has reported 21 per cent. paroled and 30 per cent. apparent cures among 1,109 lepers. Among 70 fairly early Culion cases in children 67·5 per cent. have become negative, and of fairly advanced ones 54 per cent. Released patients could not be followed up to ascertain the number of relapses, but in Hawaii 12·8 per cent. of 242 paroled patients have relapsed, but such cases clear up again quickly with further treatment. Considering the advanced nature of the great majority of Culion patients these results are very satisfactory.

L. R.

- i. NOLASCO (J. O.). **Histopathology of Leprosy under Local Infiltration: II, the Nature of the Yellowish Globules in Treated Lesions.**—*Jl. Philippine Islands Med. Assoc.* 1930. July. Vol. 10. No. 7. pp. 273–276. [10 refs.]

- ii. NOLASCO (J. O.). **Local Effects of Infiltration with Buffered and Nonbuffered Solutions of Sodium Hydnocarpate and Alepol.**—*Ibid.* pp. 277-281. [4 refs.]
- iii. SAMSON (J. G.), LARA (C. B.) & CRUZ (M. C.). **Treatment of Leprous Lesions of the Nasal Mucosa.**—*Ibid.* pp. 291-299. [3 refs.]
- iv. EUBANAS (Froilan). **The Progress of Chemotherapeutic Investigations in Leprosy.**—*Ibid.* pp. 300-308. [41 refs.]

This interesting series of papers deals with various aspects of treatment by the very experienced Philippine workers.

i. Dr. Nolasco reports on the nature of the yellowish globules found in leprous tissues under local infiltration treatment with chaulmoogra ethyl esters, and the conclusion is come to that in all probability they are a modified form of the injected drug, which may thus be retained in the tissues up to twenty-two days.

ii. Dr. Nolasco also reports the results of a careful series of experiments on dogs to determine the effects of injecting various strengths of buffered and non-buffered solutions of sodium hydnocarpate and alepol into the skin of the chest and abdomen, as shown by subsequent histological sections. Evidence of inflammation and congestion with a fibro-cellular exudate were found, very similar to those produced by iodized ethyl esters of *H. wightiana* oil; they were the same with buffered as with non-buffered solutions, and did not vary with the pH concentration. The irritant properties apparently reside in the fatty acid radicle, since control injections with salt solution did not produce them. Intracutaneous injections caused thrombosis of the larger subcutaneous vessels, which it is thought would limit the value in local treatment.

iii. Drs. Samson, Lara and Cruz report on the local treatment of leprous nasal lesions by different methods, including that of Dr. F. G. ROSE by ionization with alepol or potassium iodide, and Dr. LOWE's method of irrigating with weak permanganate solution followed by snuffing up a mixture of one part each of Hydnocarpus esters, creosote and camphor and nine parts of olive oil, and compare them with their own plan. In this they use fulguration by means of an insulated unipolar electrode, with a diathermy apparatus current, inserted just over the affected part of the nasal mucous membrane (but without touching it) until it is charred, after first thoroughly anaesthetizing it with 5 per cent. cocaine. They also used a 5 to 10 per cent. solution of chromic acid solution on a cotton-tipped applicator as a swab, or both methods alternately. They report on 227 consecutive cases treated and observed for a year under their methods; 81 per cent. under chromic acid, 66.6 per cent. with fulguration, and 53.5 per cent. of more severe cases in which both methods were used were found to be negative bacteriologically at the end of the observation. Congestions did best, ulcers next best, and nodules were most resistant. Profuse bleeding occasionally followed fulguration, but was controlled by further applications or by packing the nasal cavity. The importance of such forms of local treatment depends on the frequency in the Philippines with which nasal infections have been found after the skin is free.

iv. F. Eubanas contributes a brief historical account of the progress of chemotherapeutic investigation in leprosy. He falls into a slight

error when he states that HEISER suggested to ROGERS the "probability of isolating the active principles of (chaulmoogra) oil" and making soluble salts for injection, for ROGERS has himself recorded that he had made such an attempt several years before HEISER's 1916 visit to him in Calcutta.

L. R.

ADVIER & PEIRIER. Mode d'action des huiles de *Caloncoba* et de leurs dérivés sur les bacilles acido-résistants. [**Mode of Action of Caloncoba Oils and their Derivatives on Acid-Fast Bacilli.**]—*Bull. Soc. Path. Exot.* 1930. Oct. 8. Vol. 23. No. 8. pp. 767-772.

The authors record some experiments on the lines of the work of WALKER and SWEENEY on the action of derivatives of Caloncoba, chaulmoogra and hydnocarpus oils in inhibiting the growth of acid-fast bacilli. They used bovine tubercle bacilli ground on Heyden-Hesse medium, with which they mixed 1 in 5 to 5,000 of the drugs, and they also used olive oil and control tubes. They confirmed the earlier results to some extent, but found that Caloncoba oil (one variety of which is the Gorli seed of West Africa) had less action than chaulmoogra and hydnocarpus oil preparations. They observed that after some time the acid-fast bacilli became granular without losing their staining properties, and they look on this as supporting the view that these oils have a therapeutic effect against the acid-fast lepra bacillus.

L. R.

CALLENS (Jos.). Traitement de la lèpre par injection d'une léproline. [**Treatment of Leprosy by Injection of a Leprolin.**]—*Bull. Soc. Path. Exot.* 1930. Nov. 12. Vol. 23. No. 9. pp. 909-911.

The author reports that in the Belgian Congo he has added to the usual chaulmoogra ethyl ester treatment injections of a leproline made by triturating leprosy nodules with 60 per cent. alcohol and glycerine in equal parts and centrifuging. The supernatant fluid of two centrifuges is collected and used in doses of 1 to 2 cc. weekly subcutaneously. The results are said to be good.

L. R.

PALDROCK (A.). Zur unspezifischen Behandlung der Lepra mit Yatren-Casein, Lipatren, Leprosan und Alepol. [**Non-Specific Treatment of Leprosy.**]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1930. May. Vol. 34. No. 5. pp. 237-243.

Yet another paper advocating CO₂ and gold treatment, and claiming that it is the only "specific" treatment of leprosy, and that none of the other methods tried in a few cases produced "specific" results.

L. R.

CHIYUTO (Sulpicio). **Problems of the Negative Lepers.**—*Monthly Bull. Philippine Health Service.* 1930. July. Vol. 10. No. 7. pp. 321-328.

As the result of the remarkable progress in the treatment of leprosy the increasing number of recovered lepers who are discharged yearly

has raised serious problems in relation to them, especially now that in the Philippines lepers are released when they have remained negative bacteriologically for six months, but are expected to attend centres for eighteen months' further treatment. In the Cebu division 50 per cent. of these were found and 36 per cent. were reporting more or less regularly for treatment. Many of the negative cases elect to remain on at Culion owing to difficulties in obtaining employment if released, and to family ties in the settlement. The majority are desirous of work, but others get accustomed to being supported in idleness at Culion, while the unfounded fear of the public of discharged lepers creates difficulties for them. "The present segregation system was no doubt justifiable two decades ago when segregated lepers were never expected to get cured or returned to normal life," but now that "lepers under scientific and proper medical care and treatment are able-bodied men capable of performing mental and manual work," the segregation law should be amended by making able-bodied lepers work while confined in a leprosarium, and recovered lepers should earn their living as agriculturists.

L. R.

GOMEZ (Luis B.). **Preliminary Survey on Negative Lepers in the First Sanitary Division, Cebu.**—*Jl. Philippine Islands Med. Assoc.* 1930. Aug. Vol. 10. No. 8. pp. 322-326.

This paper deals with the very important and difficult question of following up recovered lepers discharged on parole after successful treatment, to determine how far the results are lasting. Of 148 such cases who were traced in one division 135 remained negative and 13, or almost 10 per cent., had become positive again. A number of patients had ceased to attend the centre for further treatment, but these were mostly living at a distance involving heavy travelling expenses. The social conditions of the discharged patients are also dealt with, and help for the families of segregated lepers when required is recommended, as well as compulsory training of boys and girls in some productive occupation while at Culion to enable them to gain their livelihood after their discharge.

L. R.

TRINCAO (Carlos). Les réactions de Kahn et de Wassermann chez les lépreux. [**The Kahn and Wassermann Reactions in Leprosy.**]—*C.R. Soc. Biol.* 1930. Oct. 16. Vol. 105. No. 27. p. 160. [2 refs.]

The Kahn and the Wassermann tests were both carried out in 61 lepers, and were in agreement in 36, or 59 per cent. In 25 in which there was disagreement 14 differed in the degree of the reactions and in these in 11 the Kahn was the more sensitive. In the remaining 11, with absolute discordance, the Wassermann only was positive in 1 case and the Kahn only in the other 10, so the latter appears to be the more sensitive reaction in leprosy. In none of the patients was syphilis suspected.

L. R.

AHUJA (M. L.) & MALICK (S. M. K.). **Serological Diagnosis of Syphilis in Lepers.**—*Indian Jl. Med. Res.* 1930. Oct. Vol. 18. No. 2. pp. 707-710. [7 refs.] [Central Research Inst., Kasauli.]

The authors report the use of Kahn's qualitative procedure for obtaining evidence of syphilis in 100 lepers. The results were in agreement with the Wassermann test in 90 per cent. of the cases. The Kahn test is simpler to perform, but in some cases rather less easy to read.

L. R.

TÔYAMA (Ikuzo), MIYOSHI (Shukuji) & KUBOKAWA (Katsumi). **A Contribution to the Serology of Leprosy.**—*Japanese Jl. Dermat. & Urol.* 1930. Sept. Vol. 30. No. 9. pp. 887-934. [In Japanese. English summary pp. 93-97.] [Dermat. Urolog. Clinic, Imperial Univ., Tokyo.]

The authors give details of (1) a floccule-forming reaction and (2) a complement-fixation reaction, both of which they regard as of value in the diagnosis of leprosy. Confirmation or otherwise will be awaited with interest. For the technique the original paper must be consulted.

L. R.

MOLINELLI (Ernesto A.) & RÉ (Pedro M.). **L'amino-acidémie dans la lèpre.** [**The Amino-Acidaemia in Leprosy.**]—*Rev. Sud-Américaine de Méd. et de Chirurg.* Paris. 1930. Aug. Vol. 1. No. 8. pp. 781-785. [6 refs.] [Faculty of Med. Sciences, Buenos Aires.]

The authors tabulate details of 39 lepers in whom they investigated the degrees of amino-acidaemia. They conclude that an increase may occur in all three types of leprosy; normal figures were met with in some, but in no case was there decrease except during an exacerbation of the disease. In over half the cases a parallelism was noted between the clinical evolution of the disease and modifications in the amino-acidaemia.

L. R.

WHERRY (W. B.). **Cultivation of an Acid-Fast Bacillus from Leprosy.**—*Philippine Jl. Sci.* 1930. Dec. Vol. 43. No. 4. pp. 577-580. With 2 figs. on 1 plate. [2 refs.]

This paper is best summarized in the author's own words as follows:—

"An acid-fast bacillus was grown in a semisolid medium composed of equal parts of nutrient agar, and hen's ovomucoid and yolk, prepared by boiling in 3 to 6 per cent. glycerin solution, when there was added to this 1 or 2 drops of oleic acid and 1 or 2 drops of 10 per cent. dextrose solution for each cubic centimeter of medium. Multiplication occurred best in cultures incubated at 35° to 37° C., with little oxygen present but carbon dioxide present. Microscopic examination after four to six weeks incubation showed the presence of numerous microscopic colonies. Growth was obtained from three cases. From two of the primary cultures, subcultures were obtained at a time when the primary cultures were three and one-half months and one month old, respectively. Like the lepra bacilli in smears

from cases, the cultivated bacilli do not stain by the acid-fast method if they are first treated with xylol and alcohol."

L. R.

NORTH (Edgar A.). **An Investigation in Rockhampton into the Possible Relationship between Human and Rat Leprosy.**—*Health*. Canberra. 1930. July. Vol. 8. No. 7. pp. 67-74.

This inquiry was made at Rockhampton, Australia, in relation to the premises occupied at any time by nineteen known human lepers, since in five years 80 rats had been found infected with rat leprosy in the town. Of 15 lepers, 12 gave a history of previous contact with lepers; this is in agreement with a statement of L. ROGERS. No convincing evidence was found of any connexion between human and rat leprosy.

L. R.

SCHLOSSMANN (K.). Ueber Gleichgewichtsstörungen der Eiweisskörper im Blutserum Lepröser. [**Disturbances of Equilibrium in the Serum-Proteins of Lepers.**]—*Ztschr. f. Immunitätsf. u. Experim. Therap.* 1930. Vol. 68. No. 1/2. pp. 154-169. [24 refs.] [Bact. Inst., Tartu-Dorpat, Estonia.]

The author reports on a study of the blood serum in lepers, in which the chemical and physical alterations of the serum-albumin and serum-globulin play a prominent part. The sera of 18 lepers, 20 syphilitics and 10 healthy persons were examined by azotometrical albumin-estimation, complement fixation and the Sachs-Georgi reactions. The albumin values for normal human blood were first determined with the help of the azotometer, including the total albumin, the serum-globulin and the serum-albumin respectively, and then similar observations were made on the blood of the leprous and syphilitic subjects. The globulin fractions were not found to be uniformly increased in the leprous and syphilitic sera. The syphilitic sera showing a low albumin content generally give a strong positive complement fixation reaction, but similar leprous sera usually give negative or only weakly positive reactions. Further, the Sachs-Georgi reaction does not run parallel with the globulin and the albumin content of leprous sera, and the globulins of leprous sera are more stable and give heavier sedimentation than the globulins of syphilitic sera.

L. R.

RAJEWSKI (A. S.). Zur biochemischen Charakteristik der Lepra. [**Biochemical Changes in Leprosy.**]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1930. Dec. Vol. 34. No. 12. pp. 651-657. With 1 chart in text.

The first part of this paper deals with the variations in the mineral salts in nerve leprosy. The author concludes that in stationary forms the calcium balance is maintained, but in actively progressing forms calcium salts are deficient and sodium salts are increased; but these changes do not run parallel to the severity of the disease. Milk alters the loss of calcium salts into a gain. The calcium content of the serum is usually within the normal limits.

In part 2 the carbohydrate metabolism is dealt with. He finds it to be reduced in leprosy, and he thinks this is largely due to functional disturbance of the liver.

L. R.

REVIEWS AND NOTICES.

HANDBUCH DER HAUT- UND GESCHLECHTSKRANKHEITEN. 1930.
 Vol. 10. Part 2. pp. xviii+907. With 220 figs. **Die Lepra**
 [KLINGMÜLLER (Victor) pp. 1-805; & Index pp. 843-907].
Lepra in Literatur und Kunst. [Leprosy in Literature and Art.]
 [GRÖN (K.) pp. 806-842. With 48 figs. (1 coloured)]. 1930.
 Berlin: Verlag von Julius Springer. [Bound Rm.146; Un-
 bound Rm.138.]

These two works concerned with leprosy are bound together in part 2 of the tenth volume of a handbook of diseases of the skin and genitals, with many contributors and several editors whose names are given on the cover, and issued by the German Dermatological Society. Dr. Klingmüller of Kiel starts his Introduction with a definition of leprosy in general terms to the effect that it is a contagious and transferable disease, confined to man. The method of transmission is not fully known. It is generally chronic with sometimes acute outbursts, and appears in two chief forms, nodular leprosy and nerve leprosy, together with mixed forms. Most cases are incurable and death is only a question of time. There has, however, been a great improvement during the present century in methods of treatment, and cures and partial recoveries are recorded. Leprosy may appear in any land, race or climate, and at any age, and among rich and poor. All these aspects are fully dealt with and discussed in the chapters which follow with a wealth of reference to many authorities—indeed, few writers on the subject of leprosy can have escaped the author's notice. Following a history of leprosy from ancient times, there is a long section giving the geographical distribution of the disease in all continents and countries. Such figures as are given in this part are generally those referring to the present century; but history shows clearly the reduction, and almost the disappearance, of leprosy in Europe following upon segregation of lepers and improved methods of sanitation and types of living among the general population. The cause of the disease is Hansen's bacillus, discovered in 1874, an acid-fast germ extremely difficult to deal with as regards culture methods. No one has succeeded in producing a pure culture with which leprosy can be reproduced in man or animals. The bacillus is fully described as to behaviour in trial culture media and as to staining reactions and microscopic appearance, and the possible transmission to certain animals is considered. Insects as possible transmitters are put under review; but there does not seem to be any proof of such transmission. The clinical part of the book is very full and the appearances which may develop in any form of leprosy are clearly shown in the illustrations, and, apart from the diagnostic features visible in the skin, etc., the effects of infection on the blood and internal organs receive attention. Differential diagnosis and prognosis are followed by a chapter on prophylaxis. The isolation of cases is the most useful method of preventing the spreading of leprosy; but the author notes that want of money often makes it difficult to carry out this system to a perfect end. The final chapter deals with direct and indirect treatment of the disease and brings hope. Much has been done and cures have been recorded since it was discovered by Sir Leonard ROGERS that the bacilli of leprosy can be destroyed by hydriocarpates and morrhuates. The author mentions salvarsan, arsenic, vaccines, endocrine gland preparations, and even diluted snake venom. A bibliography covering 60 pages ends the book. With great impartiality and intense industry, Dr. Klingmüller has produced a work of reference which will be of great use to every medical library.

ii. Of this short essay of thirty-six pages it is not necessary to say much. Literature and Art, writes Dr. Grön of Oslo, ideal factors of culture, have both to contain the Greek standards of beauty and goodness. Besides books mentioned in the text, such as "Armen Heinrich" by HARTMANN VON AUE and "Le lépreux de la cité d'Aoste" by XAVIER DE

MAISTRE, a list of books and plays on the subject of leprosy is to be found at the end of the essay. The plates and other illustrations showing examples of leprosy in art are very well reproduced. Six of these refer to Job as a leper and belong to the sixteenth century. Two of these introduce the devil in the act of inflicting the disease upon his temporary victim. Lazarus and the dog appear in a miniature and in a picture painted about 1570. We cannot refer to all the illustrations; but one of St. Martin cutting his cloak to share it with a beggar and several referring to St. Elizabeth should be mentioned. They include a fine reproduction of Murillo's picture "The Holy Elizabeth" to be seen in Madrid.

J. H. Tull Walsh.

BOREL (E.) [Médecin Commandant des Troupes Coloniales, Chef de Laboratoire à l'Institut Pasteur de Saigon]. **Les Moustiques de la Cochinchine et du Sud-Annam.** [The Mosquitoes of Cochinchina and South Annam.] Préface de E. ROUBAUD.—423 pp. With 122 figs. & 3 plates. (Monographie III. Collection de la Société de Pathologie Exotique.) 1930. Paris: Masson et Cie. [70 fr.]

Besides the descriptive catalogue of the mosquitoes of Cochinchina and the territory immediately adjoining, which forms its bulk, this volume also includes a preface (by Prof. E. ROUBAUD) containing some biographical detail of the author, an introductory section on the topography and meteorology of the country, and an epilogical section on three of the notorious diseases transmitted by mosquitoes, namely malaria, filariasis, and dengue fever. The Preface informs us that the author, M. E. Borel, was a Surgeon-Major of the Colonial Service of France, who studied Medical Entomology in Prof. Roubaud's laboratory during a large part of the year 1924 with a view to undertaking direction of the antimalaria service of the Pasteur Institute of Saigon in Cochinchina. A local mosquito-survey, which was carried on from 1924 to 1928, was one of the fundamental operations undertaken by Borel on his return to Saigon. Some of its results have already been noticed in the *Archives des Instituts Pasteur d'Indochine*; its completed results were among the documents deposited in Roubaud's laboratory by Borel when he returned to France in 1928. Borel died in October of that year, and the publication of the results of his work in the present monographic form has been ably conducted by Prof. Roubaud, who states that he has added to it "a small complement of figures with their necessary legends" and some fine photographs illustrating some of the more typical breeding-places of anophelines.

The descriptive roll of the mosquitoes includes 95 species—25 Anophelinae; all the rest segregated as Culicinae—and occupies 340 pages. The individual descriptions of species, which include (so far as has been possible) both the adults and the larvae, are careful and concise, are liberally illustrated in text-figures of significant anatomical features, and take due note of facts of pathological significance and of local distribution. The 25 Anophelines are grouped in 2 subgenera—Anopheles and Myzomyia—and the habits and environment of their larvae, and the predilections of their adults in relation to human affairs, are set forth in a convenient and independent table.

The introductory section contains a great deal of significant meteorological detail. Of the 34 pages in the concluding section, 23 are allotted to malaria; most of these are quite pertinent to the business of the medical entomologist, but those dealing with the morbid manifestations and clinical treatment of the disease seem to be superfluous.

A. Alcock.

KIRK (J. Balfour) [M.B., Ch.B., D.P.H., D.T.M. & H., Director, Medical and Health Department, Mauritius]. **Public Health Practice in the Tropics.**—pp. xiv+498. With 80 illustrations. Churchill's Empire Series. 1931. London: J. & A. Churchill, 40, Gloucester Place, Portman Square. [15s.]

The subject matter dealt with in this volume is divided by the author into two, part I under the title "Preventive Medicine" occupying 353 pages and part II under "Sanitation" occupying the remainder of the total 487 pages. The first chapter in part I is devoted to climatic and physiological considerations, the latter including dietaries and clothing for the tropics. The second chapter deals with maternity and child welfare, and in introducing these subjects thus early in his volume the author not only assigns them a prominence which is unusual but also emphasizes the fact that the rapid development of such services will have an incalculable effect for good in spreading the knowledge and practice of hygiene among tropical peoples. The principal diseases of the tropics are set out in alphabetical order, most space being given to Plague, 54 pages, and Ankylostomiasis, 28 pages; Sleeping Sickness 27 pages, Malaria 20 pages, and little space to Yellow Fever, 7 pages, and Yaws, 3 pages.

Part II on Sanitation begins with Chapter XXII on Housing and Town Planning. School hygiene, Milk and Milk supplies, Meat supplies, Water supplies in Rural areas and small towns, Public latrines and Baths are next discussed. The question of the tube or bore hole latrines for tropical village communities might well have received some attention and discussion. Chapters on the Collection and Disposal of Excreta, on Vermin and Public Health follow. An ingenious stomoxys trap invented by M. Bourgault du Coudray is noted and figured. The book ends with chapters on Disinfection and Disposal of Refuse.

It is probable that in subsequent editions the author may find it expedient to rearrange his values somewhat. For example the subjects of malaria and yaws receive in this volume rather less space than ankylostomiasis and beriberi, and more attention might be given to village problems of sanitation. After all, the village populations of the tropics are far in excess of the urban populations, and their sanitation problems are proportionately greater.

The book is frankly a compilation, and the author is anxious and willing to acknowledge the many sources to which he is indebted. But the fact that a book of this nature is largely a compilation by no means necessarily detracts from its value. In fact it is in these days difficult for any book which covers such a vast field of work to be other than largely a compilation, and the author has been successful in producing in a compact form and in a readable manner the essential information.

D. B. Blacklock.

MAJUMDAR (Akhil Ranjan) [M.B., Bengal Medical Service, etc.]. **Bed-Side Medicine. A Hand-Book of Medical Diagnosis. Symptoms, Physical Signs, and Laboratory Methods, from Tropical Standpoint.** With a Foreword by Major-General J. W. D. Megaw, C.I.E., I.M.S., Director General of Indian Medical Service. Second Edition.—pp. xi+584. With 190 figs. 1930. Calcutta: The Book Company Limited, 4-4A, College Square. [Rs. 7-8.]

Dr. Majumdar may be congratulated on the 2nd edition of his book. It will undoubtedly be of great use to those for whom it is intended—the medical practitioner and the student of medicine in India. He has certainly covered the whole ground very thoroughly and has incorporated in the volume many of those practical hints and tips which, as he rightly says, can only be learnt at the bed-side. The book is divided into sections

each of which deals with the particular system in a very efficient manner. The section devoted to fevers is particularly good and the same remark applies to that on the alimentary system, in which, as elsewhere in the book, the author has taken pains to include much recent work. A good feature is the large number of photographs and illustrations, many of them original, which have been included. There is no doubt that this book will be of considerable assistance in differential diagnosis. Current medical literature has been freely drawn upon, and has been acknowledged in a full list of references. The book is handy in size and the index is adequate. One must, however, take note of the fact that there are many misprints and defects in punctuation which should be remedied in future editions.

M. L. C. Irvine.

VAN DER MADE (Wilhelmina Maria). **Constante en inconstante eigenschappen der bloedgroepen. De verdeeling der bloedgroepen in West-Java.** [Constant and Inconstant Attributes of Blood Groups. Distribution of Blood Groups in West Java.] [Thesis for Doctorate in Medicine at the Medical High School, Batavia.]—pp. 99+x. With 10 text figs. & 1 map. Weltevreden: Druk van G. Kolff & Co.

The first two out of the three chapters which make up this monograph are devoted to what may be designated respectively the specific and non-specific features of blood groups. Under the heading of specific characterization there are discussed most of the theory and known facts of the subject. Apart from the careful description of technique the most interesting sections are those relating to the importance of blood grouping for transfusion, the inheritance of blood groups, and their inclusion in the scheme of Mendelian transmission. Questions of alleged paternity may be capable of settlement by means of blood tests. The author expounds the subject of the distribution of blood groups in human progeny in great detail from a Mendelian point of view. Another side to this question of inheritance is that of the racial distribution of blood groups. In this regard it was determined by the HIRSCHFELDS that the A grouping was characteristic of, and predominant in, European peoples and that a B grouping prevailed in oriental races. Their biochemical "race index" is represented by the relative proportion of A groups to B groups in a test population. It is necessary, however, to include in each of these two single groups the group AB which is possessed, as regards its erythrocytes, of both A and B agglutinable characters and whose serum in consequence is incapable of agglutinating either A or B erythrocytes. The race index (I) is given as $(A + AB)/(B + AB)$ and has been used by the author on a large scale to determine the affinities of the component elements of the population of West Java.

In the second chapter of the work a very full discussion is entered upon as regards the physical chemistry and the colloidal chemistry of the blood so far as it affects the subject of blood grouping. It is in the third chapter that the author sets out what is essentially her own work. This ranges over a variety of subjects from the anthropological question of the presence of a population older than the predominant population and existent in the outlying parts of Java, to the correlation, if any, exhibited by body-build, disease and mental character. The general trend of this part of her research may best be realized by setting out her main conclusions. These are:—

1. The higher biochemical race index in the outlying districts of West Java indicates that a residual population is to be found there which is older than the Soendaneese.

2. Sufferers from tuberculosis, lunatics and prisoners, among Soendaneese, Javanese and Sumatrans, afford no evidence of any appreciable deviation from the race index.

3. No definite correlation could be found between character, body-build, finger prints and blood groups.

A further investigation had reference to possible alteration of agglutination titres. Thus it was found that repeated bleeding, within a short interval of time, seldom produces any effect on the agglutination titre of a blood-group serum and that addition of phenol or soda to serum, unless in high concentration, is without harmful action.

W. F. Harvey.

WAR OFFICE. **Memoranda on Medical Diseases in Tropical and Sub-Tropical Areas 1930.** Fifth Edition.—300 pp. With 129 figs. & 1 double plate. 1930. London: H.M.S.O. [6s.]

The first edition of this work, as stated in a short preface by the Director General, Army Medical Services, was compiled by the late Sir Andrew BALFOUR and dealt with Diseases of the Mediterranean; the two succeeding issues were also prepared by him. The fourth and present editions were entrusted to Colonel W. P. MACARTHUR, who enlarged the scope of the work to include Medical Diseases in Tropical and Subtropical Areas. This last issue is printed on a slightly smaller page and in somewhat larger type, but by judicious revision, elision and addition the whole has been brought up to date although the total of pages is increased by 23 only.

Six years have elapsed since the previous edition was published and in the interval the advance in knowledge of diseases of warm climates has been considerable, notably in blackwater fever, yellow fever, and sprue. The two last received no mention in the fourth edition, but now find place; tropical typhus is another welcome addition. Other omissions noted in the former review (this *Bulletin*, Vol. 22, p. 341), namely epidemic dropsy, leprosy and yaws, are still conspicuous, and rabies would seem to be of sufficient importance to warrant inclusion. It must have been no easy task to decide how much to include and doubtless, though we know them not, there are good reasons for these omissions.

As the arrangement of subjects in the book is alphabetical it may be well to consider certain points calling for notice in a similar sequence.

As in previous issues the term Ancylostomiasis is used to cover hook-worm infestation whether by Ancylostoma or Necator. To spell it with a "k" has advantages when the condition is not restricted to the former parasite. The insertion of diseases transmitted by Simuliidae is fully warranted by the growth of knowledge on onchocerciasis. The persistence of *V. cholerae* in the gall-bladder of the chronic carrier is stated as a fact (p. 80), though this has been the subject of research and is definitely denied by some workers in India (*Indian Journal of Medical Research*, July, 1929). The inclusion of an account of acute gastro-enteritis in children in the Diarrhoea section is a good thought. Influenza, which appeared in the last edition, is now omitted, as is also Pneumonia, and rightly so, to make room for matters of more importance. Under the diagnosis of Leptospirosis (p. 157) is the statement "Yellow fever . . . may simulate leptospirosis ictero-haemorrhagica." Mention might be made, either here or in the new section on yellow fever, of the fact that not mere simulation but actual cases of leptospirosis may occur in a yellow fever epidemic and, if rapidly fatal, may be mistaken for yellow fever. It is quite probable that NOGUCHI had the ill-fortune to fall in with one of these when he found what he called *L. icteroides*; if so, it indeed led him to a series of very erroneous conclusions, though he may not, initially, have been so "grievously deceived." Under Malaria to indicate those species of Anopheles which are of special epidemiological importance is of vastly greater value than the mere list given in the previous issue. A new illustration of a patient with Oriental sore has replaced one which has done yeoman service for many years in this and other text-books; though the sore is perhaps not

quite such a fine specimen, this is more than compensated for by the better plate. When speaking of the treatment of plague the author sounds a timely warning on the dangers of a "run of favourable cases" leading to the vaunting of some insufficiently tested treatment; the history of blackwater fever affords another example of the same danger. A picture of the cercaria of *Sch. mansoni* usefully replaces the three indefinite forms with poor detail depicted previously. On the subject of Veldt sore and its treatment, the use of diphtheria antitoxin will not be successful unless the true Klebs-Loeffler organism is present; for cases associated with *diphtheroid* organisms (whatever this vague term may include) it is ineffectual. The fact that *Corynebacterium diphtheriae* is associated aetiologically with the condition has been handed down from year to year and from book to book largely on clinical grounds; it is a matter for wonder that the subject is not studied intensively and set at rest once for all on definite scientific bacterial lines.

The alphabetical arrangement of the contents leads to the separation of typhoid from the paratyphoid fevers. Would it not be better to class them all under Enterica, which would then find appropriate place before Fevers in the East, which includes an excellent description of the shorter tropical fevers, full of interest and instruction? A very comprehensive general account of Sprue finds a place for the first time in this edition, together with adequate detail of the treatment most successful in the author's hands.

There is a final chapter, on Zoological Nomenclature, which will prove most useful in explaining to the uninitiated the apparent vagaries of systematists in altering names.

Misprints are exceedingly few; in the title of Fig. 46 is one; the only others likely to lead to disappointment are the numbering of figures after 119. There is here a skip of 30, so that 120-129 are numbered 150-159; the prospective purchaser may thus think that there are 28 more figures in the new edition, whereas there are two less than in the fourth.

The copy sent for review has been bound up somewhat erratically, with the result that in several instances figures fail to correspond with the letterpress and undulant fever has become mixed up with typhoid and trench fever, but these small hazards, if we may so call them, do but add zest to the reading, and the work as a whole is an achievement on which Colonel MACARTHUR is to be congratulated. Whereas in attempting to include so much in so small a compass there might have resulted a mere dry catalogue of aetiology, symptoms, diagnosis and treatment, we have instead descriptions which are accurate, concise, and presented in a manner which make the reading a real pleasure.

H. H. S.

ANGLO-PERSIAN OIL COMPANY, LIMITED. **Medical Report for the Nine Months ending 31st December, 1928** [YOUNG (M. Y.), Chief Medical Officer].—105 pp. With 5 plates, 7 diagrams, 2 folding charts, 6 graphs & 1 folding map.

— **Ditto for Year ending 31st December, 1929** [YOUNG (M. Y.), Chief Medical Officer].—132 pp. With 9 plates, 18 diagrams, 2 charts & 1 folding map. [No date or place of publication stated.]

It is unusual for the larger commercial firms to publish comprehensive medical reports and much valuable information is consequently allowed to go to waste. The United Fruit Co. in the West and the Anglo-Persian Oil Co. in the East are notable exceptions. The reports reviewed here cover 9 months of 1928 and the whole of 1929, and each deals in turn with Organization and Vital Statistics, and the Medical, Surgical, Pathological, and Public Health Sections. Naturally, they deal largely with routine work, which is very heavy, but research is not neglected. Bacillary dysentery was

investigated in 1928 when a peculiar organism was isolated from a limited number of cases and the work was continued in 1929. The chief subject of research was carried out by Dr. MARSH, in 1928, on the Physiology of Heat Regulation and, in 1929, on the Etiology of Heat Hyperpyrexia. The two combined formed the subject of a paper read before the Royal Society of Tropical Medicine and Hygiene towards the end of 1930, which was followed by an interesting discussion. This paper is being reviewed separately.

Knowing that housing conditions directly influence industrial efficiency, every effort has been made by the company to provide proper housing accommodation for the staff, as an essential part of preventive medicine. In the 1929 report plans are reproduced showing types for Senior and Junior Married Bungalows, Senior Bachelor's Bungalow, and Bachelors' Flats; also for Single and Married Clerks' Quarters, and Single and Married Artizans' Quarters, the aim in each case being to ensure maximum protection from heat and spacious, well-ventilated rooms with economy of construction, but in no case have the former been sacrificed to the latter.

H. H. S.

NIESCHULZ (Otto). Surraübertragungsversuche auf Java und Sumatra. [**Surra-Transmission Experiments in Java and Sumatra.**]—*Veeartsenijkundige Med.* No. 75. Departement van Landbouw, Nijverheid en Handel Ned.-Indië. 296 pp. With 8 plates. 1930. Utrecht: Kemink en Zoon N.V.—Over den Dom.

In this volume the author brings together the accounts of his experiments, carried out in Java and Sumatra, on the transmission of surra. In his introduction he points out that the discovery of Naganol has made it possible to reduce the incidence of the disease in the equine population because the drug can be used as a prophylactic. This does not, however, assist in its eradication because the reservoir of the infection is in apparently quite healthy buffaloes.

For the proper control of surra a first essential is an accurate knowledge of the method or methods of transmission.

The present publication contains not only the experiments which have already been reported in Dutch journals, but a considerable number which have not previously been recorded.

The author reviews the literature and divides his review into sections dealing with the various kinds of insects used. Some thirty pages are occupied by a description of the materials and the technique employed in the experiments. Forty-three different kinds of insects have been tested, including *Tabanus*, *Chrysops*, *Haematopota*, *Stomoxys*, *Musca*, *Anopheles*, *Armigeres*, *Stegomyia*, *Culex*, and *Cimex*, and the bulk of the book is made up of accounts of the experiments carried out with these. No attempt was made to check the positive results reported by Cross in the transmission of Surra by *Ornithodoros*. *Ornithodoros* is not known to occur in the Dutch Indies.

The author is of the opinion that *Tabanidae* are by far the most important transmitting agents of surra, and that the transmission is a mechanical one.

A. Leslie Sheather.

TROPICAL DISEASES BULLETIN.

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[No. 5.

SLEEPING SICKNESS.

JOHNSON (W. B.). **Notes upon a Journey through Certain Belgian, French and British African Dependencies to observe General Medical Organisation and Methods of Trypanosomiasis Control.**—40 pp. With 21 figs on 7 plates. 1929. Lagos: Govt. Printer.

The journey upon which this report is based was made primarily with the purpose of encouraging co-operation between workers upon the problems of trypanosomiasis and tsetse fly control

The author remarks that in Belgian and French territory sleeping sickness is being controlled by the general application of the medical passport system, which involves the medical examination of all persons moving from their own locality. The disease is being gradually diminished in the most heavily infected areas by the repeated examination of the whole population, with treatment of cases by organized brigades. Research upon the efficacy of certain drugs is being carried out at Leopoldville and Brazzaville. Removal of hamlets in fly-infested areas to settlements along main routes is being carried out in certain districts.

In Tanganyika the problem is exceedingly serious owing to the infestation of a large portion of the territory with *G. morsitans* and *G. swynnertoni* and the existence of endemic and epidemic foci of *T. rhodesiense* infection carried by these species. Control is being effected by well-planned concentration of scattered hamlets into cleared settlements, where improved methods of agriculture upon economic lines are being instituted by the agricultural officers attached for this work. Movement of the population in infected areas is controlled by a permit system. Prevention of future epidemics depends upon early notification of fresh local outbreaks, and Johnson considers it doubtful whether the existing medical staff and rural dispensaries are sufficient for this purpose. Experiments with late grass burning are showing encouraging results in certain types of country.

In Uganda certain districts are declared "infected" or "restricted," and in these movement is only allowed upon permit. The shore and islands of Lake Victoria are being repopulated under close supervision. Cases of sleeping sickness are not at present numerous, but close contact between man and fly exists in many districts and any relaxation of the present regulations would probably lead to recrudescence of the

disease. Fly control consists of localized clearings for the purpose of settlements.

In the Sudan a well-organized and fully staffed campaign has practically eradicated sleeping sickness from the two infected provinces of Mongalla and Bahr el Ghazal. Isolation of patients in treatment camps, removal of villages from fly-infested areas, and control of movements of inhabitants and emigrants have been the measures adopted.

Johnson then passes to certain recommendations for Nigeria. He considers that there is need for a more general examination of the population for sleeping sickness. The work during the past two years has shown that sleeping sickness is widely spread and is causing a disconcerting mortality and depopulation of the Northern Province. Little is known of its range in the Southern Provinces and in the Cameroons. The gravity of the situation has in fact been underestimated. The frontiers bordering French territory require special attention. The existing sleeping sickness staff should receive additional African assistants.

Spread of the disease, which is undoubtedly occurring, should be controlled by declaring certain main endemic centres "infected areas." In these districts labour recruiting should not be allowed or allowed only under medical supervision; no movement of inhabitants should be allowed without permits. No enterprises entailing employment of labour in such districts should be allowed unless an adequate medical staff is available. Provision should be made for compulsory treatment of patients, if necessary, and also for removal of villages into fly-free areas if such is deemed advisable.

Certain recommendations follow regarding the sleeping sickness staff necessary. Research upon the resistance of man and animals to trypanosome infection should be continued and the scientific staff should be maintained and include pathologists and a biochemist. Co-operation with other workers in Africa should be maintained by interchange of reports and by exchange of visits.

Johnson believes that much valuable information concerning tsetse fly belts in relation to vegetation belts could be obtained by aerial survey of the country, and he hopes that if such a survey be undertaken by the Survey or Forestry Departments special provision will be made for the requirements of the Tsetse Investigation.

W. Yorke.

MACLEAN (G.). A Report on Human Trypanosomiasis in Tanganyika Territory for the Year ending 31st December, 1929.—*Tanganyika Territory Ann. Med. & San. Rep. for the Year ending 31st December, 1929*. IX. Scientific. pp. 132-140.

No extension of human trypanosomiasis to other parts of the Tanganyika Territory was observed during the year 1929, nor was any evidence obtained of any local increase of epidemic proportions.

Kahama district now forms the chief centre of infection, the number of new cases having more than doubled. Next come Tabora and Nzega districts, where there has been an increase of 75 per cent. over last year's cases. There follows a discussion of the situation in the various sleeping sickness districts of the territory. This calls for no special notice.

W. Y.

MACLEAN (G.). **Sleeping Sickness Measures in Tanganyika Territory.**—*Kenya & East African Med. Jl.* 1930. Aug. Vol. 7. No. 5. pp. 120-126.

In this short article the author summarizes the measures which are being directed against Rhodesian sleeping sickness, which is the type now prevalent in Tanganyika Territory.

Method 1. This consists in establishing treatment centres in suitable places, while the homes of the people are not interfered with. It is in force in Ikoma, Mwanza Province, where most of the people have permanent homes in open country and visit the forest from time to time to hunt or fish.

Method 2. This consists in clearing bush around existing villages and frequented places. It is a valuable method in a delimited area where supervision can be maintained and was put into practice with success at Lukiliro, Lindi Province, in 1925-26.

Method 3. This consists in concentrating and consolidating a scattered population into a large community within the forest. Settlements of not less than 1,000 people are aimed at and provided the site is suitable the bigger the population the greater the prospects of success. There are several now in existence in Kigoma and Tabora Provinces with populations of over 3,000 persons.

Method 4. This is the same as *Method 3* except that when the clearing is made the new settlement borders on open country; an extreme form of it is to make the settlement quite outside the forest.

The last two measures are those now generally adopted in Tanganyika. Their adoption necessarily implies the introduction of certain agricultural measures which are discussed by the author in some detail.

W. Y

MAURICE (G. K.). **Sleeping Sickness.**—*Rep. on Med. & Health Work in the Sudan for Year 1929.* pp. 26-36.

After stating that during the year 1929 the sleeping sickness admissions for the whole of the Sudan were 20, 18 in Tembura district and 2 in Yambio, the author passes to a brief review of the work done in the Sudan during the past twenty years.

The following summary is given :—

" Measures taken in time shut out infection from two districts of Bahr El Ghazal whose combined area is seven times as large as Wales.

" Where the disease obtained a footing in Yei District of Mongalla Province, an adequate staff was able to bring a considerable epidemic under control in the space of two years, but further east the disease lingered because the staff was depleted.

" In Tembura District of Bahr El Ghazal where a serious epidemic became established, an inadequate staff could not in four years even arrest the spread of the disease, but when an adequate medical and administrative staff was provided, and the habits of the people changed, the epidemic was controlled within three years and the disease almost eradicated in the space of six.

" The maintenance of fly-free streams was aided by the planting of *Cynodon transvaalensis*."

" The habits of the people were transformed without causing resentment.

" Segregation was best effected in a Settlement where patients lived with their relatives, growing their own crops around homesteads of their own, and thereby becoming self-supporting in the space of two years."

W. Y.

BOUFFARD (G.). La trypanosomiase humaine en Côte d'Ivoire. [**Sleeping Sickness in the Ivory Coast.**]*—Bull. Soc. Path. Exot.* 1930. Nov. 12. Vol. 23. No. 9. pp. 922-927.

The recent discovery of two severe cases of trypanosomiasis among Europeans—one contracted in the lower part of the Ivory Coast almost on the coast, and the other 600 km. from the coast—has caused the author to review the state of knowledge regarding the presence of sleeping sickness in the Ivory Coast.

The endemic foci of the Upper Ivory Coast have been known for more than 30 years. BOYÉ in 1897 observed cases of clinical sleeping sickness in the regions of Odienné and of Man. BOUET in 1908 found two microscopically positive cases at Bouaké, two at Korogho, two at Touba and one at Odienné. The foci constituted a serious menace in such densely populated districts, and a hospital was created at Korogho where cases were isolated and treated. When the author was appointed director of sanitary services in 1924, the hospital no longer existed and cases of sleeping sickness were apparently exceedingly rare. The situation remained stationary up to 1929.

The foci in the Lower Ivory Coast are of more recent knowledge. The researches of BOUET in 1906 and 1908 were without result. The few cases found later were believed to have contracted the disease in the upper territories. It was not until 1913 that the first autochthonous case was found. BOUET then examined 665 inhabitants of Bingerville and district, but found only a single case. Glossina are very common in the Lower Ivory Coast and BOUET examined 458 caught at Bingerville and found only 12 infected with animal trypanosomes and none with *T. gambiense*. The records since 1914 are scanty. BLANCHARD never saw a suspicious case during his long stay at Bassam. BAUVALLÉ in 1921 examined 7,000 persons without finding a case of the disease and none have been recorded between 1924 and 1929.

At Abidjan, the most important place in the Colony, there is a large hospital where about 400 people are examined daily. Between 1924 and 1929, 11 cases of sleeping sickness have been seen. Certain of these came from the Upper Coast, the others from the regions of Abidjan and Bingerville. The author has examined the population of the three villages from whence these cases came without finding any more.

The paper concludes with a discussion concerning the explanation of this curiously scattered, purely endemic, nature of sleeping sickness in the Ivory Coast.

W. Y.

BOYÉ. La prophylaxie de la trypanosomiase en Afrique Equatoriale Française. [**Prophylaxis of Trypanosomiasis in French Equatorial Africa.**]*—Bull. Office Internat. d'Hyg. Publique.* 1930. Oct. Vol. 22. No. 10. pp. 1927-1944. [2 refs.]

A general account is given of the anti-trypanosomiasis campaign which is being conducted in French Equatorial Africa. At the beginning of 1929, 18 doctors, 19 sanitarians and 150 skilled native assistants were employed on this work. As the result of the new organization outlined in 1930 the medical personnel will exceed 33 (21 French and 12 foreign). In addition all the other medical men in the posts will contribute to the work, just as those specially engaged in sleeping sickness work will concern themselves with improving the

general hygiene of the populations visited. (The vaccination of the natives is an especially beneficial measure. The vaccinations are always done with dry vaccine which preserves its virulence for many months without special precautions.)

In 1928 the number of persons visited was 517,168 and that of old cases of trypanosomiasis treated was 15,423; the number of new cases discovered was 5,735.

A brief summary is given of the therapeutic results obtained with atoxyl, tryparsamide, "Fourneau 270" and "Fourneau 309" ("Bayer 205").

W. Y.

DE MARQUEISSAC. Note sur le fonctionnement du centre médical d'Ayos, de mars 1922 à août 1929. [**The Work of the Medical Centre of Ayos, Cameroon, from March 1922 to August 1929.**—*Ann. de Méd. et de Pharm. Colon.* 1930. July-Aug.-Sept. Vol. 29. No. 3. pp. 396-407.]

Ayos is on the River Nyong in the heart of the sleeping sickness district of Cameroon. The centre was created by the Germans in 1912, and reopened by the French in 1920. It is now a research centre, a school of *infirmiers*, and a centre of public assistance. All natives who apply for treatment are examined for trypanosomiasis by gland palpation and puncture, and blood microscopy. In doubtful cases lumbar puncture is done. In January-July 1929, 188 punctures were made on natives negative by other methods, and in 92 cases, or nearly half, trypanosomes were found in the C.S.F. The obligatory examination of all sick natives between 1922 and 1929 has affected 78,595 persons; 17,205 or 22 per cent. have been recognized as infected with trypanosomes. The numbers year by year are given in a table. Since 1924 all the boatmen on the river have been examined yearly; 1,161 cases have been thus detected, and the index of infection, at first 9.4 per cent., has been reduced to 0.9 per cent. In the course of the 8 years 177,941 sleeping sickness patients have been treated as out-patients at Ayos, and 6,763 as hospital patients. The period of detention of the latter is about 70 days (10 injections of tryparsamide at 7-day intervals). None except mental cases are detained against their will and no one is compelled to return home, for advanced sleeping sickness patients would be abandoned. In the last 12 months 18,000 subcutaneous injections of tryparsamide have been given, all by native *infirmiers*. Between September 1928 and July 1929, 144 infirmier-pupils were admitted to the school.

Figures are also given of the number of persons treated for yaws (17,000) and syphilis (99,000).

A. G. B.

LEAGUE OF NATIONS. Health Organisation. **Investigations on Human Trypanosomiasis in Mozambique. Report submitted to the Second International Conference on Sleeping-Sickness (Paris, November 5th to 7th, 1928)** [KOPKE (Ayres)]. L.o.N.P. 1930. III. 12.—31 pp. With 1 map. Geneva.

At the International Congress on Tropical Medicine held at Loanda in 1923, Kopke proposed that a medical mission should be sent to Mozambique. For various reasons it was not until July 5th, 1927,

that the mission reached Mandimba ; as the delegates from Lisbon had to be back on April 1st, 1928, there was a period of only 7½ months in which to work. It was decided to concentrate in the Nyasa Company's territory around Metarica, where cases of sleeping sickness had occurred among the Europeans.

An account of the itinerary of the mission is given in detail. It calls for no special notice. The next portion of the report deals with a proposal for the enlargement of the Central Laboratory at Lourenço Marques and its conversion into a medical research institute.

W. Y.

DUKE (H. Lyndhurst). **The Discovery of *T. rhodesiense* in Man in the Uganda Protectorate.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1930. Aug. 8. Vol. 24. No. 2. pp. 201–218. With 1 map in text. [9 refs.]

With the object of studying the development of arsenic resistance in *T. gambiense* and the persistence of this character when the strain is transmitted through tsetse to another host, an appeal was made to Medical Officers in the West Nile area for persons in whom the infection was apparently resistant to arsenic. As the result of this appeal three cases were sent to the laboratory hospital. Each of these patients was given three doses of 2 to 3 gm. of trypanamide at weekly intervals and blood examinations made daily showed the persistence of trypanosomes. The patients were then treated with Bayer with an immediate beneficial result. Before commencing treatment all three strains were secured in monkeys by blood inoculation and by laboratory-bred *G. palpalis* fed on the patients. Two of the strains behaved like typical *gambiense* save for their resistance to arsenic. One of them, "Okero," exhibited differences and is the subject of this paper. A chart is given showing the passage of this strain through monkeys and guineapigs. The tests applied to differentiate the "Okero" strain from *T. gambiense* were :—

1. Virulence in laboratory-bred animals.
2. Reaction to drugs.
3. The occurrence of posterior-nuclear forms.
4. The adhesion-test.

1. *Virulence in laboratory-bred animals.*

The virulence was examined in monkeys, guineapigs, and white rats, and the results are summarized in a table from which it is seen the average duration was in the monkey 30 days, in the guineapig 30 days, and in the rat 20 days.

2. *Reaction to drugs.*

Before leaving his home, the patient, Okero, had been given seven injections of trypanarsyl. It was his failure to respond to this treatment that led to his selection and dispatch to Entebbe as an "arsenic-resistant" case. After arrival at Entebbe he was, as already mentioned, given three further injections of trypanamide without result and recourse was consequently had to Bayer 205. In fact, with the "Okero" strain or with the laboratory strain of *T. rhodesiense* in guineapigs, it was found that doses of .03 gm. per kilo of atoxyl failed to cause the disappearance of trypanosomes, whereas guineapigs infected with *T. gambiense* were sometimes sterilized by a single dose of .01 per kilo.

3. *The occurrence of posterior-nuclear forms.*

These were found frequently and in considerable numbers in the blood of infected rats.

4. *Adhesion-test.*

It is shown in tables that Okero's blood reacted on occasion with both *T. gambiense* and *T. rhodesiense*, but the most striking and regular response was with his own strain of trypanosomes. Conversely, Okero's strain of trypanosomes reacted with the blood of animals infected with *T. gambiense*, *T. rhodesiense*, or strain "Okero," with Okero's own blood, and once with the blood of another of the three cases sent from the White Nile area who was infected with a strain diagnosed provisionally as arsenic-resistant *T. gambiense*.

Experiments showed that the "Okero" strain was able to develop in *G. palpalis* and that both gut and salivary gland infections occurred. Of 261 flies used in this work, 1.5 per cent. developed gland infections.

The article concludes with an interesting discussion which should be consulted in the original.

W. Y.

DUKE (H. Lyndhurst). **On the Occurrence in Man of Strains of *T. gambiense* Non-transmissible Cyclically by *G. palpalis*.—Parasitology.** 1930. Oct. Vol. 22. No. 4. pp. 490-504. [9 refs.] [Human Trypanosomiasis Inst., Entebbe, Uganda.]

This paper is called forth by certain criticisms made by the reviewer in his summary of the author's article on "The Bionomics of the Polymorphic Trypanosomes of Man and Ruminants," which appeared in the Final Report of the League of Nations International Commission on Human Trypanosomiasis. The particular criticism dealt with is that the reviewer considered that the number of flies employed by Duke was too small to warrant the important inference that 4 of the 12 strains studied in the human subject were non-transmissible cyclically by laboratory-bred *G. palpalis* [this *Bulletin*, Vol. 25, p. 759].

TABLE.

Animal.	Date.	Total flies dissected.	Total infected flies.	Percentage of infected flies.	No. of infected flies alive at 25th day.		Percentage of gland infections.	Transmissibility index.	Total.
					With glands infected.	Total.			
M 507	3-19.ii.29	226	8	3.5	0	7	0	0 } 0 } 0 } 0 }	1,543
	5-24.iii.29	385	9	2.3	0	7	0		
	19.v.-11.vi.29	483	9	1.8	0	6	0		
	22.vi.-11.viii.29	449	3	0.6	0	2	0		
M 506	23.iii.-18.iv.29	343	4	1.1	0	3	0	0 } 0 }	858
	19.v.-11.vi.29	515	5	0.9	0	5	0		
M 606	14.x.-14.xi.29	456	6	1.3	0	4	0	0	—
M 547	22.v.-21.vi.29	430	10	2.3	0	8	0	0	—
M 601	24.ix.-14.x.29	425	6	1.4	0	3	0	0	—
M 607	15.x.-11.xi.29	375	6	1.6	0	5	0	0 } 0 }	900
	19-31.xii.29	525	0	0	0	0	0		

Duke, after welcoming such criticism of the "admitted weakness" of his case, set himself to collect more data with the object of further testing the accuracy of his contention.

The first strain dealt with was isolated from a European. A detailed history of the case is given, from which it appears that the patient had been infected either two years, or approximately 12 months, according to whether he was infected in the West Nile Area in 1927 or near Kampala early in 1928. By September, 1928, somnolence was a definite symptom, and Duke believes that in view of this it is probable that the infection actually occurred early in 1927. The patient had been untreated save for a course of stovarsol and two injections of N.A.B. in October, 1928. The strain was isolated on January 18th, 1929, by subcutaneous inoculation of 10 cc. of the patient's citrated blood. The subsequent history of the strain through six monkeys is shown in a table, and in Table 2, which is here reproduced, details are given of the fly experiments performed upon this strain and its infectivity to *G. palpalis* in different animal passages. From this table the following points of interest emerge:—

"(1) Wherever more than one test was applied to a monkey the percentage of infected flies diminished in each successive test.

"(2) Of a total of 66 infected flies, 50, i.e. 75 per cent., lived 25 days or more; this high percentage of survivors greatly enhances the value of the investigation.

"(3) The percentage of infected flies in the *first* tests on each animal is fairly constant. Of the 2,255 flies employed in all these first tests 40, i.e. 1.7 per cent., were infected; and of these 40 flies, 30, i.e. 75 per cent., lived 25 days or longer.

"In the course of these experiments 4,612 flies were fed upon animals infected with this European strain; 66 flies developed massive gut infections, but in none were the salivary glands infected; 75 per cent. of the infected flies lived 25 days or longer."

Details are next given regarding experiments performed with three other strains of *T. gambiense* which proved to be non-transmissible. These are as follows:—Strain Odira obtained from a native in the West Nile District of Uganda 10 days before he died of sleeping sickness; Strain Pio also from a patient in the West Nile Area and isolated 18 days before death; and Strain Eli from a patient in the West Nile area who had been sent to Entebbe on account of his failure to respond to treatment with a full course of trypanamide. After isolation of the last strain by inoculation of the patient's blood into a monkey, Bayer 205 was given with the result that trypanosomes immediately disappeared from the blood and glands.

In the opinion of Duke, it is the prolonged struggle between the mammal and the trypanosome which results in the loss by the parasite of transmissibility by tsetse. A chronic but steadily progressive disease is, he thinks, most likely to produce this result. He remarks, however, that even in the final stages of a long-standing infection, as judged by the alteration of the cerebrospinal fluid, a strain does not always lose its transmissibility.

Details are given of experiments which show that another strain isolated from a man shortly before death was still transmissible.

The presentation of the data above summarized is followed by a theoretical discussion regarding its explanation and significance.

The following are the conclusions:—

"1. Evidence is submitted that strains of *T. gambiense*, non-transmissible by *G. palpalis*, occur in man in nature in regions where *G. palpalis* is the normal vector of this trypanosome.

"2. Such strains may be still infective to tsetse, but cannot invade the salivary glands of the fly.

"3. The application of successive tests to one and the same animal supplies further evidence that the infectivity of a strain to fly is liable to diminish as the disease in the animal progresses towards a fatal termination."

W. Y.

FISCHER (Odón). Humorale Veränderungen bei einem Falle von Trypanosomiasis. (Ein Beitrag zur Autoantikörperfrage.) [**Humoral Changes in a Case of Trypanosomiasis.**]—*Klin. Woch.* 1930. Dec. 27. Vol. 9. No. 52. pp. 2436–2438. [9 refs.] [Psychiat. & Nerve Clinic, Univ., Breslau.]

The clinical history is given of a patient—a European aged 43 years—who, in 1914, suffered from malaria and blackwater fever in the Cameroons; in 1925 he again had malaria. In the autumn of 1928 he developed sleeping sickness and was treated with germanin, the acute symptoms lasting four weeks. On his return voyage to Africa in autumn 1929 he developed delusions of grandeur and other symptoms suggestive of general paralysis, and had to return to Europe for further treatment. The further details of the case record the development of pulmonary tuberculosis.

The history raises the question whether the mental disturbances were due to syphilis—a history of which was denied—or to tropical malaria or sleeping sickness. With a view to throwing light on the subject the author undertook a number of serological tests and examinations of the blood and spinal fluid.

Microscopic examinations of the blood were invariably negative: the differential blood count showed 11 per cent. of eosinophils and the Arneth count a definite shift to the left. Coverslip preparations of fresh blood showed pronounced autoagglutination of the red cells. Tests for the cold haemolysin were negative.

A number of experiments were conducted with the serum of the patient and of various cases of tabes and general paralysis to ascertain what complement-binding antibodies were present. The serum of the patient gave negative results with cholesterin, ox heart, and with an alcoholic acetone extract of human brain, but a strongly positive result with an alcoholic acetone extract of human red cells of Group O. The syphilitic cases gave positive results with the first two and negative with the third.

Examination of the spinal fluid failed to reveal the presence of trypanosomes. The cell count varied from 37 to 136, and the albumen was increased. The Wassermann reaction was once positive and once negative.

The paper closes with a discussion of the difficulties of diagnosis.

W. Y.

CODVELLE, JAUSION & DUTREY. Un cas de trypanosomiase à forme mégalo-splénique. [**Case of Trypanosomiasis with Large Spleen.**]—*Bull. et Mém. Soc. Méd. Hôpit. de Paris.* 1930. Nov. 10. 3rd Ser. Vol. 46. No. 29. pp. 1573–1577.

An account is given of a case of sleeping sickness in a European who had returned to France from the Ivory Coast. The authors record that the chief feature of note was the exceptional size of the spleen, which led to an error of diagnosis. The splenomegaly of trypanosomiasis is, as a rule, very moderate and when pronounced suggests malaria, but this infection was excluded in the present instance.

W. Y.

YORKE (Warrington) & MURGATROYD (F.). **Studies in Chemotherapy. III. The Action *in Vitro* of Certain Arsenical and Antimonial Compounds on *T. rhodesiense* and on Atoxyl- and Acriflavine-Resistant Strains of this Parasite.**—*Ann. Trop. Med. & Parasit.* 1930. Oct. 22. Vol. 24. No. 3. pp. 449–476. [26 refs.]

In the first paper of this series the authors, with ADAMS, showed that the action of drugs on trypanosomes could be studied *in vitro* provided that serum of rabbit, ox, sheep, horse or pig was used as supporting medium, whereby the trypanosomes are kept alive for at least 24 hours at 37° C.; the concentration of the parasites must not exceed a certain level [this *Bulletin*, Vol. 27, p. 237]. In the 2nd paper they showed by this method that *in vitro* as well as *in vivo* human serum and plasma destroy *T. rhodesiense* but spare *T. gambiense* [loc. cit. p. 804] and on this observation found an interesting hypothesis of the epidemiology of human trypanosomiasis. In the present paper they reach chemotherapy proper.

The following is the summary of their paper :—

" 1. As a preliminary step in an investigation designed with the object of throwing light on the mechanism of their curative action in the infected animal, the trypanocidal action of a number of preparations of arsenic and antimony was examined *in vitro*.

" 2. The compounds employed were atoxyl, arsacetin, tryparsamide, stovarsol, halarsol, halarsol thioglycollate, *p*-amino-phenylarsenoxide, reduced atoxyl thioglycollate, reduced arsacetin, reduced tryparsamide thioglycollate, reduced stovarsol thioglycollate, novarsenobillon, arsenophenylglycine, arsenophenylglycineamide, sodium arsenite, stibenyl, stibosan, potassium antimony tartrate, phenol, aniline, and acriflavine.

" 3. The trypanocidal action *in vitro* of these drugs was examined on a normal strain of *T. rhodesiense* and on atoxyl- and acriflavine-resistant varieties of this parasite.

" 4. With the normal strain of trypanosomes it was found that the organic pentavalent compounds are but slightly trypanocidal, a solution of 1 : 1,600 being required to destroy the parasites within 24 hours. Aniline and phenol were several times more active. The organic trivalent arsenical compounds are extraordinarily trypanocidal, even when diluted several hundred million times they killed the trypanosomes within 24 hours; this also applies in the case of the arsenobenzols—novarsenobillon and arsenophenylglycineamide—but arsenophenylglycine, although very active, is much less so than the other arsenobenzols, a solution of 1 : 3,200,000 being required to destroy the trypanosomes in 24 hours. Sodium arsenite and tartar-emetic likewise displayed considerable action, the corresponding trypanocidal titres being respectively 1 : 3,200,000 and 1 : 6,400,000.

" 5. The response of each of the two resistant strains to the various compounds, although frequently very different from that of the normal strain, proved in every case to be exactly similar to one another. The resistant strains were but slightly more resistant to the pentavalent arsenicals and to aniline than was the normal strain, withstanding as a rule about twice the concentration of drug as did the latter strain. But to the various trivalent arsenicals and arsenobenzols the resistant strains exhibited extraordinarily different degrees of resistance, e.g., to reduced atoxyl thioglycollate, *p*-aminophenylarsenoxide and arsenophenylglycine, they were only about 4 or 8 times as resistant as was the normal strain, whereas to arsenophenylglycineamide and to reduced tryparsamide thioglycollate they were no less than 256 to 1,024 times as resistant as was the normal strain. To sodium arsenite and to tartar-emetic the resistant strains proved to be just as susceptible as did the normal strain.

"6. From these facts the following deductions are drawn :—

(i) The trypanocidal activity *in vitro* of the organic trivalent arsenicals, of the arsenobenzols, of sodium arsenite, tartar-emetic and acriflavine is such as to warrant the conclusion that their therapeutic activity in the infected vertebrate requires no other explanation than that it is solely due to the direct action of the drug on the parasite. The action of the organic pentavalent arsenical and antimonial compounds is so slight as to render such an explanation of their therapeutic activity untenable. A reasonable explanation of their therapeutic value appears to be that they are reduced in the body of the host to the corresponding trivalent compounds.

(ii) The term '*arsenic resistance*' as applied to atoxyl-resistant and acriflavine-resistant strains is a definite misnomer. These strains are not arsenic resistant, but resistant to various organic compounds of arsenic. The similarity of the behaviour of the two strains made resistant to atoxyl and acriflavine respectively, the varying degree of resistance which they exhibit to the different organic compounds of arsenic, and the fact that they are just as susceptible to sodium arsenite as is the normal strain, all indicate in the clearest possible manner that the resistance of these strains is not to arsenic, but to the substituted phenyl radical."

The authors point out that while the injection of drugs into trypanosome-infected animals affords information of their trypanocidal activity, none is afforded of the mechanism of their action, whether it is direct or indirect. Hitherto the results of *in vitro* experiments have been conflicting and of doubtful value, as is shown by a review of the published papers, because the experimental conditions were faulty. PAPAMARKU seems to have been the first to devise satisfactory conditions [loc. cit. Vol. 24, p. 964]. The medium used in this work consisted of equal parts of sheep or rabbit serum and Ringer solution containing 0.2 per cent. of glucose, the serum being heated to 62°–63° C. for half an hour before the addition of the Ringer-glucose solution, and the observations were made for at least 24 hours at 37° C.

An early result of the experiments was the discovery that the character of drug resistance is inherent in the parasites themselves and not, as has often been assumed, dependent on the host. Another finding was that the serum used in the medium is an important factor in determining the exact trypanocidal value of a drug. With media made from certain sera contact with the drug for 24 to 48 hours greatly reduces the trypanocidal value. The conditions were therefore standardized. For these and other details the paper must be consulted. Two pages of graphic formulae of the compounds studied are a useful feature of the paper.

A. G. B.

SICÉ (A.). Remarques sur les conceptions actuelles du traitement de la trypanosomiase humaine. [**Present Ideas of Treatment of Human Trypanosomiasis.**]—*Bull. Soc. Path. Exot.* 1930. July 9. Vol. 23. No. 7. pp. 721–724. [6 refs.] [Pasteur Inst., Brazzaville.]

There is now no doubt that atoxyl, alone or associated with emetic, is very efficacious in the treatment of sleeping sickness provided the cerebrospinal system is intact (less than 10 cells per cmm., and 0.15 to 0.20 gm. of albumin per litre). Any sign of involvement of the cerebrospinal nervous system is a contra-indication to the use of

atoxyl and emetic. Details are given of a couple of cases cured by two injections of atoxyl.

The indications for "270 Fourneau" are more extensive. It is a powerful trypanocide in the first stage of the disease, and efficacious in the second stage. A case is cited showing the action of a single injection of "270 Fourneau" in a case of sleeping sickness.

In the second stage of the disease tryparsamide has very great curative powers, as, in a less degree, have also "73" (etharsanol), "134," "139," and especially "175," which is very close to tryparsamide and has given at Brazzaville very definite amelioration. The arsenobenzols have at Brazzaville given only mediocre results.

There are cases—fortunately rare—in which the disease continues to progress notwithstanding efficient and uninterrupted treatment with trypanarsyl or tryparsamide; the drug may prolong life, but fails to cure. The causes of these failures are complex, e.g., old lesions, very active virus, etc. In such cases it is necessary to abandon arsenicals and the author has tried bismuth salts on a number of patients. Unfortunately, the natives readily develop stomatitis and require careful observation; the results, although inconstant, have not been bad.

Of "Bayer 205" and moranyl the author has not had sufficient experience to write with authority. He is not able to confirm BARLOVATZ regarding the value of emetic in patients in the second stage, nor did he find intravenous injections of 4 cgm. per kilo. of sodium salicylate every 7 days to be of any use.

In conclusion, Sicé writes that notwithstanding what we have learned about sleeping sickness much remains unknown. He believes that it is imprudent, if not dangerous, to lay down a standard treatment or "standard-cure" as does MURAZ [this *Bulletin*, Vol. 27, p. 814]. He believes that each patient must be treated as an individual.

W. Y.

MURAZ (G.). A propos de la "cure-standard" appliquée, en Afrique Equatoriale Française, aux trypanosomés. [**The "Standard Cure" of Sleeping Sickness in French Equatorial Africa.**—*Bull. Soc. Path. Exot.* 1930. Nov. 12. Vol. 23. No. 9. pp. 917-922. [3 refs.]

The author takes exception to SICÉ's remarks regarding his "standard-cure," i.e., 12 injections of atoxyl. He points out that he does not regard this course of injections as an ideal treatment, but rather one necessarily imposed by the conditions of work in French Equatorial Africa, which are briefly summarized.

W. Y.

LEGER (Marcel). Trypanosomiase humaine méningée et tryparsamide. [**Human Trypanosomiasis with Mental Symptoms and Tryparsamide.**—*Bull. Soc. Path. Exot.* 1930. Nov. 12. Vol. 23. No. 9. pp. 950-958. [1 ref.]

A lengthy account is given of two cases of sleeping sickness. Both patients at the time they were seen by the author—and a correct diagnosis made for the first time—exhibited mental disturbances. These were, however, of quite different nature; the one assumed the form of attacks of delirium during the febrile periods, the other presented the picture of neurasthenia seen in the prodromal period

of general paralysis. The former patient had frequent attacks of fever and was in a state of great emaciation and very poor physical condition, whilst the latter, except at the commencement of the disease, had no fever and was but slightly emaciated.

The author does not desire to labour these different cerebral types of the disease which have already been noted by MARTIN and his collaborators, but he wishes to draw attention to their early appearance; in both cases the duration of the disease was not more than one year.

The results obtained from treatment with tryparsamide were marvellous, and are described in some detail. An interesting point is that one of the patients developed visual troubles during treatment. These were haziness of vision and pronounced contraction of the field. If the case had been less grave treatment would have been suspended, but in view of the circumstances it was decided to continue and the result was completely successful. The observations made on this case also showed that tryparsamide must be given in a long series of doses. Seven or ten weekly doses of a total quantity of 11.5 gm. and 27 gm. were not sufficient, fever and blood relapse being noted 14 days after the first course and 22 days after the second. These facts do not indicate drug resistance on the part of the trypanosome, for the parasites immediately disappeared on further treatment, but that there were certain regions where the parasites were sheltered from the action of the drug ("de terrains vagues" of VERNES).

W. Y.

LAUTERBURG (M.). Zur Frage der Dosierung von Tryparsamid.
[On the Dosage of Tryparsamide.]—*Schweiz. Med. Woch.* 1930.
Dec. 20. pp. 1204–1206. [9 refs.]

Reference is made to a previous paper [this *Bulletin*, Vol. 26, p. 707] in which it is recorded that amongst 27 cases of sleeping sickness, in the second or third stages of the disease, 26 per cent. developed slight visual disturbance, 14.8 per cent. more serious trouble, and 7.4 per cent. blindness. All the patients had received weekly doses of 2 to 3 gm. of tryparsamide. Advanced cases of the disease are much more prone to develop visual troubles than early cases and must accordingly be treated with caution; even early cases, however, may suffer from transient visual disturbance. After the first two or three injections many patients experience a mistiness of vision and see bright sparks. Such symptoms are an indication for caution. Objective signs of eye damage are not manifest early enough to enable one to prevent with certainty complete blindness developing. The fundus remains apparently normal for a long time and pallor of the disc sets in quite late. The single dangerous sign observed is narrowing of the fields of vision and even this sign is sometimes too late.

These facts led the author to consider whether decreasing the dose of the drug might not lessen the danger of eye trouble without interfering with its therapeutic action. A stimulus to this research was provided by a patient who became blind and was cured of sleeping sickness after only 7 gm. of tryparsamide given in doses of 2 gm. and 3 gm.

The author states that he has often noticed that a sleeping sickness patient shows an exaggeration of all his symptoms at the commencement of treatment. Improvement is not observed until one or two

months later. Consequently, conclusions regarding the effect of treatment should only be drawn after an observation of several months. Likewise the visual disturbances do not occur before 3 to 5 weeks after the beginning of treatment. The author has noticed that if 5 injections have been well-borne, then no untoward result is to be anticipated from further treatment. The body in time becomes capable of converting tryparsamide into a harmless compound. Thus the possibility presents itself that, just as we avoid an anaphylactic shock, so we can avoid hypersensitiveness to tryparsamide by beginning with small doses.

The author's observations on tryparsamide therapy with small doses are limited to eight months. The time is short, but nevertheless long enough to form an opinion of the effect on vision since disturbances of sight, when they do occur, set in during the first month or two.

Of 16 patients treated with weekly doses of 0.5 gm. of tryparsamide for at least 8 weeks none has developed the slightest disturbance of sight. On the other hand, recovery is but slightly slower than after the usual doses. From the beginning of treatment parasites are no longer to be seen in the blood, gland juice, or spinal fluid. The occurrence of arsenic resistance is thus not probable if it cannot be altogether excluded, because in the interior of the body some trypanosomes may remain which eventually become arsenic-fast. Only year-long observations will enable a decision to be reached. The enlarged glands quickly subside, as likewise does Kérandel's sign. The cell count of the spinal fluid sinks almost as quickly as after large doses of the drug.

The administration of small weekly doses has the disadvantage that the course of treatment is of longer duration. The average length of the course, which with weekly doses of 3.0 gm. is 2½ months, rises with the small dose to over a year. Possibly future experience will show that a dose of 0.5 gm. can be given twice weekly and thus shorten the course materially without risk of eye trouble.

[This paper raises, of course, a very important subject. The author's percentage of cases showing visual disturbance with the ordinary weekly dose of 2 to 3 gm. is unusually high. Possibly his cases were very advanced. Assuming the immediate effect of the small dose is, as the author claims, practically equal to that of the usual dose of 2 gm. or 3 gm., the real question to decide is whether or not a tryparsamide-fast race of trypanosomes is produced. It seems to be commonly agreed that a course of 30 gm. to 40 gm. of tryparsamide is necessary to produce a cure. If this be so—the reviewer must confess that he is not absolutely satisfied with the evidence—does it imply that after, say, 20 gm. trypanosomes are still living in the body? If they are it is indeed surprising that they have not become tryparsamide-resistant. The question seems to the reviewer to be one of the greatest importance in chemotherapy.]

W. Y.

CORSON (J. F.). **A Note on the Cerebrospinal Fluid in Two Relapsed Cases of Rhodesian Sleeping Sickness during Treatment with Tryparsamide.**—*Jl. Trop. Med. & Hyg.* 1930. Aug. 15. Vol. 33. No. 16. p. 233.

After giving the clinical history of two cases of *rhodesiense* infection in natives of the Maswa district of Mwanza, Tanganyika Territory, the author writes:—

" So far as can be judged by these observations which extend only over a short period, tryparsamide has no more effect on the trypanosomes in the central nervous system in late cases of Rhodesian sleeping sickness than on those in the blood either in early or relapsed cases. This contrasts with its reported great curative action in late cases of sleeping sickness caused by *Trypanosoma gambiense*. Further observation of these cases may give some indication of what prognostic value, if any, should be placed upon a diminished cell-count in the cerebrospinal fluid."

W. Y.

NÁJERA (Luis). Valoración relativa de la triparsamida y del Bayer 205, como agentes terapéuticos en la tripanosomiasis humana. [**Relative Value of Tryparsamide and Bayer 205 in the Treatment of Human Trypanosomiasis.**—*Medicina Paises Cálidos*. Madrid. 1930. Sept. Vol. 3. No. 5. pp. 394-406. With 1 chart in text. French summary.]

In order to test the relative value of Bayer 205 and tryparsamide, the author in Fernando Po placed 324 consecutive patients admitted for treatment in two groups, by relegating alternate tens to each. The total dose of each drug was 10 gm. in the course of 20 days, thus: 1st day, 0.5 gm.; 3rd, 6th and 9th days, 1.0 gm.; 12th, 15th and 18th days, 1.5 gm.; 20th day, 2.0 gm.; given intravenously in 10 per cent. dilution in distilled water.

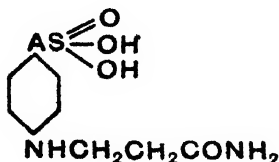
He concludes that the symptoms yield more readily to tryparsamide, but in the later stages of the disease Bayer 205 is clinically more effective; the general condition also improves more quickly with tryparsamide, and the fatality (from trypanosomiasis and intercurrent infections) [presumably during the course, for no mention is made of following up cases afterwards] is only about half when tryparsamide is given. The weight is more favourably influenced by tryparsamide; the blood changes are too slight to give any indication of preference; the effect on the c.s.f. is better with tryparsamide, but when the dosage is the same Bayer 205 is the more powerful trypanocide.

[No mention is made regarding the nature of the infection nor of the method of diagnosis.]

H. H. S.

VAN DEN BRANDEN (F.). Le produit 115 dans le traitement de la trypanosomiasis humaine. [**"115" in the Treatment of Human Trypanosomiasis.**—*Ann. Soc. Belge de Méd. Trop.* 1930. Sept. 30. Vol. 10. No. 3. pp. 275-280. [1 ref.] [Leopoldville Lab., Leopoldville, & School of Trop. Med., Brussels.]

This article deals with clinical trials of an organic arsenical supplied to the author by STRATMAN-THOMAS of Wisconsin and designated "115." It is *n* phenylglycinemethyl-amido-*p*-arsinic acid.



The drug is readily soluble in water and is given intravenously in 20 per cent. solution; the dose for an adult is 2 to 3 gm. Peripheral sterilization follows such a dose in from 5½ to 23 hours. An attempt to determine the duration of peripheral sterilization produced by a single massive dose of 4 gm. was unsuccessful as the patient disappeared after 23 days. During this period, however, weekly examination of the blood by the triple centrifugation method was always negative.

The therapeutic value of the compound was tested both on patients in the first stage and on those in the second stage.

First stage.—Two patients were given respectively 20 gm. and 45 gm. in weekly injections of 2 gm. Details are given from which it appears that both cases did excellently. The author concludes that the action of the drug in such cases is comparable to that of tryparsamide.

Second stage.—Six patients belonging to this category were treated; the spinal fluid contained from 9 to 830 lymphocytes per cmm. Details of each case are given. One patient had a blood relapse after receiving 38 gm. of the drug. In a second patient the lymphocytosis and excess of albumin in the spinal fluid disappeared after 49 gm. In a third patient visual disturbance caused treatment to be interrupted after the administration of 16 gm.; the sight subsequently became normal. In the last three patients the lymphocytosis diminished without, however, becoming normal, after the administration of respectively 20 gm., 80 gm. and 102 gm. of the drug.

The general conclusion reached by van den Branden is that this new drug has a therapeutic value approximately equal to that of tryparsamide; he adds, however [not without reason], that trial should be extended to more numerous cases.

W. Y.

SICÉ (A.). Contribution à l'étude du 270 Fourneau appliqué au traitement de la trypanosomiase humaine. [**Treatment of Human Trypanosomiasis by Fourneau 270.**]—*Ann. Inst. Pasteur.* 1930. Aug. Vol. 45. No. 2. pp. 221–242. [3 refs.] [Pasteur Inst., Brazzaville.]

The preparation "270 Fourneau" is the sodium salt of acetyl *p*. amino-o-oxyphenyl arsinic acid. It is employed in 20 per cent. solution in distilled water and is given subcutaneously or intravenously in weekly doses varying from 15 to 30 or 35 mgm. per kilo. of body weight. Between 1925 and 1929 a total of 357 patients have been treated with the drug; 106 were in the first stage of the disease and 251 in the second stage with altered cerebrospinal fluid. As these two groups reacted differently to the drug they are dealt with separately.

Patients in the first stage. The drug is a powerful trypanocide causing rapid disappearance of the trypanosomes from the blood and glands. Of the 106 patients belonging to this category 97 had received no previous treatment. Four (3·7 per cent.) relapsed, in 3 (2·8 per cent.) the disease progressed and involved the cerebrospinal system, 35 (33 per cent.) disappeared, 3 (2·8 per cent.) died, and 61 (57·7 per cent.) were apparently cured. Details are given in tables.

Patients in the second stage. In this category are grouped all cases in which the spinal fluid contained more than 5 cells and 15 to 22 mgm. of albumin. Of the 251 patients 213 had not previously received

treatment. In 3.5 per cent. there were blood relapses, in 13.1 per cent. the disease progressed, in 51.3 per cent. there was prolonged improvement (possibly cures) and 14.3 per cent. died. Details are given in very instructive tables.

The author observed two complications from use of the drug. The first, which consisted of vomiting many hours after its administration, was not accompanied by any constitutional disturbance and was of no importance. The second consisted of visual troubles of the kind met with in the use of trypanamide but, unfortunately, they occur earlier and are more frequent; these visual disturbances were never seen in patients in the first stage of the disease, but were met with in 1.9 per cent. of the nervous cases.

The author states that the drug can be given with equal result either subcutaneously or intravenously. He recommends an initial dose of 15 mgm. per kilo. of body weight increasing by 5 mgm. each weekly dose until the maximum of 30 to 35 mgm. is reached; at this level the treatment should be continued until a total quantity of 300 to 350 mgm. per kilo. of body weight has been given in patients of the first stage. The average course of the treatment is thus ten to twelve weeks. In the nervous type the drug must be given with great caution, and the treatment continued until the spinal fluid has become normal.

W. Y.

GIEMSA. Ueber weitere chemotherapeutische Studien mit einer neuen Benzolarsinsäure (Arsenpräparat 4002). [**Further Chemotherapeutic Studies with a New Benzol Arsinic Acid (Prep. 4002).**] --*Ztschr. f. Immunitätsf. u. Experim. Therap.* 1930. Vol. 69. No. 1/2. pp. 86-99. [18 refs.] [Inst. for Ship & Trop. Diseases, Hamburg.]

This paper is a continuation of the author's preliminary report on the therapeutic activity of a new organic arsenical known as "Prep. 4002" prepared by the I.G. [this *Bulletin*, Vol. 27, p. 832]. The toxicity of the compound for laboratory animals is given in the following table:—

Animal.	Method of administration.	Dose tolerated per 20 gm. of animal in mgm.	Dose tolerated per kilo. of animal in mgm.	Lethal dose per kilo. of animal in mgm.
Mice ...	Subcutaneous	75	3,750	7,000
Rats ...	"		500-600	1,500
Rabbits ...	"		500-600	800-1,000
Guinea-pigs ...	"		200	300
Mice ...	Intravenous	45	2,250	4,000
Rabbits ...	"		400	600
Cats ...	"		200	400
Mice ...	Oral	200	10,000	15,000
Rabbits ...	"		400-500	700-800
Cats ...	"		400	

The therapeutic action of the drug was tested for various strains of trypanosomes in mice and rats, and the results are summarized in a table which is here reproduced.

THERAPEUTIC EXPERIMENTS WITH INFECTED MICE AND RATS. A SINGLE SUBCUTANEOUS INJECTION GIVEN.

No.	Drug.	Animal employed.	Trypanosome strain.	Animal in which strain was maintained.	Day of treatment after infection.	Curative dose in mgm. per mouse and 1 kilo. rat.		Maximum well tolerated dose per 20 gm. mouse and 1 kilo. rat.	Index.
						Occasional cure.	Radical cure.		
1	Atoxyl	Mouse	Nagana 30	Mouse	5-6	4	—	4	Worse than 1:1
2	Tryparsamide	"	"	"	5-6	30	36	45	1:1.25 to 1:1.5
3	"	"	"	"	5-6	6	10	75	1:7.5 to 1:12.5
4	"	"	Nagana Prowazek	"	5-6	3	5	75	1:15 to 1:25
5	"	"	<i>T. rhodesiense</i>	"	6-7	4	5	75	1:15 to 1:18.7
6	"	"	<i>T. gambiense</i>	Rat	Chronic infection	8	10	75	1:7.5 to 1:9.3
7	"	"	<i>T. equiperdum</i>	Mouse	5-6	8	10	75	1:7.5 to 1:9.3
8	"	"	<i>T. equinum</i>	"	5-6	20	50	75	1:1.5 to 1:3.7
9	"	"	<i>T. evansi</i>	Guinea pig	Chronic infection	7	10	75	1:7.5 to 1:10.5
10	"	Rat	<i>T. evansi</i>	"	"	600	—	500-600	Worse than 1:1
11	"	Mouse	<i>T. congolense</i>	Rat	10-20	75	—	75	—
12	"	"	<i>Schizotryp. C.</i>	"	15-18	Never curative	—	75	—
13	"	Rat	<i>T. lewisi</i>	"	Not pathogenic	500 Without any action	—	500-600	—

These results are considered in detail and the following summary of the conclusions is given:—

The grounds are discussed for searching among the aromatic arsenic acids for new trypanocidal and spirochaeticidal compounds of greatest therapeutic action. Such grounds lay chiefly in the greater diffusion capacity of the arsenic acids as compared with the arsenobenzols and other chemotherapeutic compounds, e.g., Bayer 205.

From new compounds of this sort good results were to be expected in the treatment of the late stages of sleeping sickness and syphilis since the parasites living in the spinal canal are readily accessible to molecularly dissolved compounds. With the increasing field of action of such compounds the chances grow that the portion penetrating the spinal fluid after a moderate dose will reach sterilizing concentration.

A new benzol arsenic acid "Prep. 4002" offers good prospects for the therapy of sleeping sickness, because in experiments in laboratory animals it shows a far greater trypanocidal power than other hitherto employed pentavalent arsenical compounds (atoxyl, tryparsamide), and because it has a pronounced action on *T. rhodesiense* which is strongly resistant to other arsenicals.

It can be shown that $\frac{1}{2}$ to $\frac{1}{3}$ of the amount of the drug injected remains in molecular solution in the blood and can be separated by ultrafiltration of the blood serum.

For combined treatment "Bayer 205" ranks in the first class.

The preparation also acts on spirochaetes. Rabbits infected with syphilis can be cured by parenteral or oral administration of the drug.

W. Y.

i. REINER (K.) & LEONARD (Clifford S.). **On the Mechanism of Chemotherapeutic Action. I. Formation of the Parasitotropic Agent from Arsenicals.**—*Proc. Soc. Experim. Biol. & Med.* 1930. May. Vol. 27. No. 8. pp. 788–791. [7 refs.]

ii. —, — & CHAO (S. S.). **Mechanism of Chemotherapeutic Action. II. Rôle of Reticulo-Endothelial System in Formation of a Parasitotropic Agent from Arsenicals.**—*Ibid.* pp. 791–793. [16 refs.] [Experim. Research Labs., Burroughs Wellcome & Co., Tuckahoe, N.Y.]

i. Reference is made to a previous paper in which it was shown that Bayer 205 once bound to trypanosomes could not act upon other trypanosomes. It was expected that arsenicals would behave similarly to Bayer 205, but this was found not to be the case. If an emulsion of trypanosomes was brought in contact with neoarsphenamine dissolved in nutrient broth in a dilution of 1/5,000, or with sodium atoxylate, and allowed to stand for 20 minutes, then centrifuged and washed, the trypanosomes remained almost as virulent as the controls. It is remarked that the time of action and dilution of the chemotherapeutic agent were far below the limits which produce a damaging effect as shown by the change in motility.

These experiments show that the arsenicals investigated either were not bound to the parasite, or, if bound, were not active as chemotherapeutic agents. Since these compounds are active when injected into infected animals, it seemed probable that an interaction occurs between the chemotherapeutic agent and the host, resulting in a production of a new active compound. The findings of SWIFT and ELLIS,

and of STÜHMER, indicated that such compounds might be present in the blood of a non-infected healthy animal treated with neoarsphenamine. Corresponding experiments were conducted in three stages: (1) treatment of a normal animal with the arsenic compound; (2) treatment of the trypanosomes with the serum of an animal treated with the chemotherapeutic agent; (3) infection experiments, in the manner described above, with trypanosomes treated with the plasma or serum from rats and rabbits, both arsenic treated and untreated.

In Stage 2 no *in vitro* parasitocidal action could be detected, but in Stage 3 trypanosomes treated with neoarsphenamine-plasma or serum showed, in accordance with the experiments of SWIFT and ELLIS, a distinct protection as compared to infections with the same number of trypanosomes treated similarly with normal plasma or serum.

The author concludes as follows:—

"Whereas, in the case of Bayer 205 the chemotherapeutic action is due to two factors, namely direct action of the chemotherapeutic agent on the parasite and protective action of the host (reticulo-endothelial system), in the case of arsenic compounds an interaction between the host and the chemotherapeutic agent must also be assumed, since, *compared with the arsenic content, a very active parasitotropic agent is present in the serum or plasma of animals treated with neoarsphenamine. This agent acts by the same mechanism as Bayer 205.* The active compound is probably a loose combination of serum protein (globulin) and neoarsphenamine, for it is also formed *in vitro* by mixing neoarsphenamine with serum or plasma.* Atoxyl and tryparsamide are, however, as little active with serum as either substance in broth. Results, analogous in principle to those obtained with neoarsphenamine, were also found with bismuth thiosulphate."

ii. As the authors succeeded in demonstrating that arsenicals are transformed in the host into a more active parasitotropic agent, they endeavoured to obtain some idea of the importance of the reticulo-endothelium in chemotherapeutic action by investigating its influence on the formation of this active agent in non-infected arsenical-treated animals, thereby eliminating the influence of the blockade on the infection itself. Their procedure was as follows:—

"Animals (rats and rabbits) were injected intravenously with 5 cc. per kilogram of india ink, diluted 1 : 5 with physiological salt solution. Twenty hours later these animals and controls received equal amounts of arsenicals intravenously (sodium atoxylate was given intraperitoneally). Doses: 100 and 250 mg. per kilogram. One day later (in one experiment, 3 hours later) the animals were bled. The plasma of blocked and non-blocked animals was diluted with 3·5 per cent. sodium citrate in the same proportion (1 : 2 or 1 : 3). These plasma were tested for their activity by the combined *in vitro* and *in vivo* method, described previously,† using for each blood sample 2–3 rats. Virulence controls of the trypanosomes were treated similarly with normal plasma, likewise diluted in the same proportion with citrate. In cases where the effect was slight the test was later repeated with the same blood sample and always with exactly the same result, indicating a high accuracy and sensitivity of the method and that the virulence of the control trypanosomes was kept unchanged. The arsenic content of the blood-plasma, spleen and liver was estimated by the Gutzeit method. For relative estimation of neoarsphenamine, we also used the method suggested by Hiramatsu."‡

* It is obvious that CASTELLI and GONDER were investigating this combination.

† Reiner, L., and Leonard, C. S., *Proc. Soc. Exp. Biol. and Med.*, 1930, xxvii, 788.

‡ Hiramatsu, *Sei-i-Kwai Med. J.*, xlviii, 133; *Eng. Abst.*, 1929, Sect. 5.

It was never found that the blocked animal's blood was less active than that of the unblocked, which would follow if the reticulo-endothelium tended to enhance chemotherapeutic activity. As a rule, the blood of the blocked animals was more active than that of the unblocked and the arsenic content of the plasma was higher in the blocked animals than in the unblocked. The non-blocked spleen usually contained more arsenic than the blocked, but the arsenic content of the liver did not differ in blocked and non-blocked animals.

The authors conclude that "blockade" does not inhibit the formation of the parasitotropic agent in the host, but rather may enhance it. Since the blockade agent tends to increase the arsenic content of the blood of animals treated with arsenicals, it is probable that the increased activity is due to an increased concentration of the active principle.

W. Y.

ADANT (M.). Au sujet de l'arsénorésistance des trypanosomes. [**Arsenic Resistance of Trypanosomes.**].—*C R Soc. Biol.* 1931. Jan. 16. Vol. 106. No. 1. pp. 57-58. [4 refs.] [School of Trop. Med., Brussels.]

After discussing the work of LEVADITI and YAMANOUCHI on the production of trypanotoxyl by the action *in vitro* of liver extract on atoxyl and of its recent confirmation by DUBOIS who used tryparsamide instead of atoxyl [this *Bulletin*, Vol. 27, p. 829], the author considered that it would be of interest to attempt to verify in another way whether the trypanotoxyl of LEVADITI is in reality the trypanocidal substance elaborated in the organism after the injection of such medicaments as atoxyl or tryparsamide. He prepared trypanotoxyl from tryparsamide and left a dilute solution of it in contact with *T. pecaudi* *in vitro* for 2 to 3 hours; he then washed the trypanosomes and injected them into mice. When the mice showed parasites in the blood he treated them with 2 to 2.5 cgm. of tryparsamide and compared the result with that obtained with mice infected with the normal strain. No difference was observed, the treated trypanosomes being just as susceptible as the normal strain.

W. Y.

KOLMER (John A.) A Note on the Trypanocidal and Spirocheticidal Activity of "Bayer 205" (Germanin).—*Amer. Jl. Syph.* 1930. July. Vol. 14. No. 3. pp. 320-325. [4 refs.] [Research Inst. of Cutaneous Med., Philadelphia.]

The following summary is given:—

"1. The maximum tolerated dose of a lot of Bayer 205 was found to be approximately 0.380 gm. per kilo of rat by intravenous injection.

"2. The trypanocidal activity of Bayer 205 for rats infected with *Tr. equiperdum* was found to be from 2 to 3 times higher than arsphenamine, about 5 times higher than neoarsphenamine and about 140 times higher than tryparsamide.

"3. The chemotherapeutic index of Bayer 205 in experimental trypanosomiasis (*Tr. equiperdum*) was found to be about 190 while the index for arsphenamine was about 21.6, neoarsphenamine 34, and tryparsamide 3.6."

W. Y.

- i. LAUNOY (L.) & PRIEUR (M.). Nouveaux documents relatifs à l'étude du mécanisme de l'action trypanocide du 205 Bayer-309 Fourneau. [**Mechanisms of Trypanocidal Action of Bayer 205.**]—*C.R. Soc. Biol.* 1930. Dec. 12. Vol. 105. No. 34. pp. 690-692. [2 refs.]
- ii. — & —. Action synergique d'un sérum spécifique et du 205 Bayer-309 Fourneau, injecté à dose curative fractionnée, dans le traitement du nagana expérimental de la souris.—[**Synergism of Specific Serum and Small (Non-Curative) Doses of Bayer 205 in Experimental Trypanosomiasis in Mice.**]—*Ibid.* pp. 692-694. [1 ref.]

i. Further experiments are recorded supporting the conclusions previously published [this *Bulletin*, Vol. 27, pp. 833 and 834].

A cat was injected subcutaneously with a dose of 0.04 gm. of Bayer 205 per kilo. of body weight on December 11th, 1929. On April 10th (121 days later), on May 16th (157 days later) and on June 20th (192 days later) the animal was injected intraperitoneally with 1 cc. of mouse blood containing numerous *T. brucei*. The third injection infected; the animal had a series of blood crises and died on November 7th—135 days after infection. On September 23rd, when trypanosomes were present in the blood, Mouse A was subinoculated. The mouse showed trypanosomes in the blood on October 8th and died on October 23rd, thus exhibiting a great prolongation of the usual period of infection, viz., 3 days. Two mice subinoculated from Mouse A died after an infection of 5 days.

Another Mouse B was subinoculated from the cat on October 14th; this mouse died on November 8th, i.e., after an infection of 25 days; a mouse subinoculated from it died in 10 days.

Another similar experiment, in which the prophylactic dose of Bayer 205 was 0.015 gm. per kilo., is described, as is also a comparable experiment in a mouse.

As the result of this work, the authors conclude that after a prophylactic dose of Bayer 205, although the animals may have lost their refractory state, one can nevertheless observe in certain cases a condition which is characterized by a diminution of virulence of the trypanosome. This diminution of virulence may be such that a spontaneous cure may result, or, failing this, there may be a remarkable prolongation in the evolution of the disease. As a rule, the normal virulence is regained in the second passage, but sometimes not until the fourth passage.

ii. As shown in previous papers, three things may happen when an animal (cat) which has received a preliminary dose of Bayer 205 is injected with trypanosomes after it has lost its refractory state. The animal may behave as normal and succumb to the infection in the usual time; the injection may be short and subside spontaneously; or the infection may assume a relatively chronic form proving fatal only after a prolonged period. In the present paper experiments are recorded which were devised with the object of throwing light on the mechanism of this phenomenon.

The serum of a rabbit, infected with nagana on September 23rd and killed on October 3rd, was heated to 55° C. Thirteen mice, the blood of which contained 4 to 6 parasites per microscope field, were divided into three groups. Group 1 (5 mice) were given intravenously increasing doses of the rabbit serum, viz., 0.3 cc. to 0.7 cc. per 20 gm. body weight; in each case the volume injected was made up to 1 cc. by the addition of physiological saline. Group 2 (5 mice) were given the same quantities of serum

+0.000015 gm. of Bayer per 20 gm. mouse. Group 3 (3 mice) were given the drug alone. Two mice served as controls.

All the mice of Group 1 were dead in 11 days. One of the mice of Group 2 died negative on the 8th day and the remaining four were alive on the 31st day. One of the mice of Group 3 died on the 9th, 10th and 12th days, respectively. The control animals were dead in 72 hours.

In a second series of experiments the conditions were the same except that the dose of drug used was 0.00001 gm. per 20 gm. mouse; and in a third series the serum of a normal rabbit was used instead of that of an infected animal.

It thus appears that the addition of a fraction of the curative dose of Bayer 205 (about $\frac{1}{4}$) to a quantity of specific serum, insufficient of itself to sterilize the mouse, allows of sterilization of the organism. There is here to be seen a very clear example of synergism.

W. Y.

ZEISS (Heinz) & UTKINA-LJUBOWZEWA (Xenia). Weitere Untersuchungen ueber den Nachweis von Germanin (Bayer 205) im tierischen Organismus. [Further Investigations on the Distribution of Germanin (Bayer 205) in the Animal Organism.]—*Ztschr. f. Immunitätsf. u. Experim. Therap.* 1930. Vol. 68. No. 1/2. pp. 170–181. [17 refs.]

A summary is given of the previous work of MAYER and Zeiss, and others, showing that the presence of "Bayer 205" could be demonstrated in the serum and in certain organs of animals for considerable periods after they have been injected or fed with the drug.

In the present work the authors have continued their investigations on this subject. Their general plan of investigation was as follows:—

1. The treatment of healthy rabbits with germanin, complete exsanguination, and colorimetric estimation of the drug in the serum and organs. This method was based on the work of STEPPUHN, Zeiss and BRYCHONENKO [this *Bulletin*, Vol. 21, p. 394] and of STEPPUHN and Utkina-Ljubowzewa (1924).*

2. The treatment of trypanosome infected rats with germanin serum from rabbits.

3. Various biological therapeutic experiments with germanin serum from sheep, and germanin-spinal fluid from men and trypanosome infected rats.

In the first experiments three rabbits were injected intravenously and one subcutaneously with doses varying from 0.4 to 0.7 gm. of germanin and the amount present in 1 cc. of serum determined after intervals varying from 2 hours to 43 days.

In the next series of experiments six rabbits were given an intravenous injection of the drug, exsanguinated after various periods, and the amount of drug present in the various organs determined. The result of all this work is summarized in tables from which it is seen that the highest concentration is found in the serum, and that, of the various organs examined, the kidneys, lungs, spleen and liver contain the greatest quantity of the drug.

The authors next pass to an enquiry concerning the therapeutic activity of the serum of normal rabbits injected with "Bayer 205." Two rabbits were injected with 0.7 gm. of the drug and exsanguinated on the eleventh and twenty-first days afterwards respectively. The serum of the first showed by the colorimetric method only a trace of the drug, whereas that of the second showed 0.2 mgm. in 1 cc. In subsequent experiments of this

* An error in this paper is corrected here, viz. :—

$n \times 3$ NaOH instead of $n/4$ NaOH ;

$n \times 4$ CH₃COOH statt $n/3$ CH₃COOH.

kind a sheep was injected subcutaneously with 0.1 gm. per kilo. of the drug ; blood was then withdrawn from the animal after 1 hour and on each of the twelve following days, and the therapeutic action of the serum tested in rats infected with *T. brucei*. The results of all these observations are set forth in a table from which it is seen that in every case the germanin serum had a definite therapeutic activity, but, as a general rule, the longer the period which elapsed before the serum was withdrawn after injection of the drug, the less active it was.

The cerebrospinal fluid of a patient suffering from multiple sclerosis, who had been treated with "Bayer 205," had no therapeutic activity when injected subcutaneously or intraperitoneally into infected mice.

W. Y.

WILSON (Douglas E.). **Mercuric Chloride in the Diagnosis of Human Trypanosomiasis** (*T. rhodesiense*).—*Jl. Trop. Med. & Hyg.* 1930. Aug. 1. Vol. 33. No. 15. pp. 217–221. [1 ref.]

After reading the paper of BENNETT and KENNY (1928)* entitled "Mercuric chloride as a diagnostic agent for trypanosomiasis in camels," the author decided to apply the test in the case of African natives suffering from sleeping sickness in Tanganyika Territory.

In its simplest form the test consists in adding to 1 cc. of various dilutions of HgCl_2 in distilled water one drop of a patient's serum and observing whether a precipitate forms within a certain time. The following dilutions of HgCl_2 were prepared:—1:15,000, 1:16,000, 1:17,000, 1:18,000, 1:20,000, 1:25,000, 1:30,000, 1:35,000, and in one or two cases a titre of 1:50,000 or 1:100,000 was used. The severity and especially the age of infection seemed to play an important part in the reaction. A heavy blood infection did not necessarily signify a well-marked reaction, but this was always observed in debilitated and old patients.

The time of the reaction was 15 to 20 minutes ; if no precipitate appeared in 20 minutes the serum was considered to be negative. The serum of most healthy natives gives a slight milky colour to the reagent, but seldom, if ever, did a precipitate develop after 20 minutes. This milky appearance the author attributes to latent malaria or other protozoal disease ; such infections do give a certain amount of reaction, but never comparable with the very marked reaction obtained in sleeping sickness. The serum of Europeans and of most normal controls gave absolutely no reaction.

The results of the observations are summarized in tables from which it is seen that the serum of patients who had received no previous treatment always gave a precipitate with high dilutions of mercuric chloride. Three cases in which 1 gm. of "Bayer 205" had been given before the test gave faintly positive results, as did also the serum of strongly positive cases to which a little "Bayer 205" had been added just before the test. The serum of relapsed or re-infected cases gave strongly positive reactions. Tests done with the serum of treated cases in which the blood had become free from trypanosomes were practically all negative.

The following are the conclusions:—

"1. Although the test is not specific, the precipitate is so very marked in cases of sleeping sickness that I should have no hesitation in treating a case

* *Jl. Comp. Path. & Therap.* Vol. 41, pp. 341–353.

as one of sleeping sickness (no microscope being available), provided I obtained in a patient the following facts :—

" (a) Some clinical signs and symptoms of sleeping sickness.

" (b) The patient came from a sleeping sickness area, or gave a history of having recently visited one.

" (c) A 5+ precipitate was obtained with the mercuric chloride test in high dilutions, say 1/20,000.

" 2. Cases 16, 17, 18, 19, and 22 help to prove that tryparsamide is useless in the initial treatment of trypanosomiasis (*T. rhodesiense*).

" 3. Cases 51 and 52 appear to prove that it is possible to have at intervals the peripheral blood microscopically negative and yet have an infected central nervous system.

" 4. The results closely resemble those obtained with the serum formalin reaction in cases of sleeping sickness.

" 5. That unfortunately the results are not specific for trypanosomiasis.

" 6. That a negative result in a European case would be a valuable aid in estimating the progress and prognosis of the disease, provided that one had a low cell-count in the cerebrospinal fluid."

W. Y.

DUKE (H. Lyndhurst) & WALLACE (J. M.). "**Red-Cell Adhesion**" in **Trypanosomiasis of Man and Animals**.—*Parasitology*. 1930. Oct. Vol. 22. No. 4. pp. 414-456. [9 refs.] [Human Trypanosomiasis Inst., Entebbe, Uganda.]

The authors state that in this paper they have not attempted to make a complete study of the mechanism of the adhesion phenomenon, but merely to define its limitations as a clinical test and to compare their results, in so far as they are comparable, with those of previous workers. They point out that the bulk of the experimental work on the Rieckenberg phenomenon in trypanosomiasis has so far been done with highly virulent laboratory strains. Definite serological differences have been noted between "passage" and "relapse" strains, and also between different "relapse" variants from a single "passage" strain. This delicacy of discrimination seemed to augur badly for the success of the adhesion test in the diagnosis of the chronic trypanosomiasis with which the authors were concerned in Uganda. Early attempts to demonstrate the phenomenon of adhesion tended to confirm these doubts. Using concentrated citrated "immune" and "trypanosome" plasmas under high power magnification and dark ground illumination, the results obtained with both *T. gambiense* and *T. rhodesiense* were entirely inconclusive. Hardly any adhesion was observed either of blood dust or of platelets, and that little was equalled in the control preparations. The technique of JOHNSON and LESTER gave similar unconvincing results. This gave rise to the inevitable conclusion that the serological homology between the reagents used by the authors, viz., the "immune" and "trypanosome" plasmas, was not sufficiently close to give a positive test.

The method recognized by LEUPOLD [this *Bulletin*, Vol. 26, p. 208] was then tried and the authors obtained their first success. On adding to a drop of citrate one drop of blood from a monkey infected with *T. rhodesiense*, which had a few days before received a curative dose of Bayer 205, and one drop from another monkey heavily infected with the same strain, every trypanosome was seen to have red blood corpuscles sticking to it; no other adherent body was seen, although

in all the preparations manifesting exclusively red cell adhesion, there were plenty of platelets to be seen among the red cells, but they remained apparently untouched.

There follows a lengthy and detailed description of the experiments performed by the authors. The results are summarized in tables which, probably owing to their necessary condensation, are rather difficult to follow. The first portion deals with experiments with *T. gambiense*, *T. rhodesiense*, the Damba trypanosome, and *T. congolense* in laboratory animals; the second portion with human cases of trypanosomiasis, and the third with an analysis of the mechanism of the adhesion test.

In the general discussion which follows the record of experimental work, the authors point out that, although previous investigators have been unanimous in claiming that the adhesion phenomenon is strictly specific, their own experiments have shown that strong reactions may take place between reagents from sources differing widely in many important respects. They consider several possible explanations of this contradiction. They are unable to accept the view that the red blood cell adhesion is of a different nature from platelet adhesion, the latter being strictly specific, and the former fortuitous in its reaction. They are inclined to believe that the explanation lies in the fact that the acutely pathogenic parasites of the well-known polymorphic trypanosomes found in many European laboratories react differently to the tissues of their hosts from the very much milder strains obtained from wild tsetse. This hypothesis is discussed at some length.

The following summary is given :—

" (1) An adhesion phenomenon has been described in which, in certain circumstances, red blood corpuscles adhere to trypanosomes.

" (2) We believe this red-cell adhesion to be a manifestation of the adhesion phenomenon already described by other workers both with trypanosomes and spirochaetes.

" (3) The substance responsible for this phenomenon of adhesion is designated in this paper *adhesin*.

" (4) The red-cell adhesion test has been studied in relation to several strains of polymorphic trypanosomes, all of which were either recently isolated from naturally infected man or animals, or had been recently passed cyclically through tsetse.

" (5) It is shown that the adhesion phenomenon is irregular and uncertain in its appearance. A single or even a number of negative observations do not exclude trypanosomiasis. A positive reaction, on the other hand, indicates recent or actual infection with a trypanosome of the same group, but not necessarily specifically identical with that employed as antigen in the test. Thus *T. gambiense* adhesin bloods not uncommonly react with *T. rhodesiense* trypanosomes and also on occasion with the Damba strain: the converse is apparently of less common occurrence.

" (6) Adhesins appear in an animal's blood in the course of its infection with trypanosomes, whether the animal be treated with trypanocidal drugs or not. When sterilising doses of such drugs are employed the adhesins gradually disappear in the course of a few months; but in untreated infections of *T. gambiense* they have been shown to persist in an active form for more than two years.

" (7) With our material it was found impossible to distinguish between "passage" and "relapse" strains by means of the adhesion test. On the contrary it was found, at all events with *T. gambiense*, that the best way to call forth the reaction in the blood of animals long infected is to employ trypanosomes from a very early infection.

" (8) Guinea-pigs have been found to be unsatisfactory animals in which to demonstrate adhesins; they are, however, useful as a source of sensitive trypanosomes. When only guinea-pig elements are present in a test a positive reaction is indicated by platelet not by red-cell adhesion.

" (9) The presence of adhesins in the blood has no apparent relation to immunity against the homologous trypanosome.

" (10) The test has been applied to over 200 human cases of trypanosomiasis in the Uganda Protectorate, and with six of these repeated observations were made. Some of these human cases reacted both to *T. gambiense* and *T. rhodesiense*, but none to *T. rhodesiense* alone.

" (11) A partial analysis has been made of the mechanism of red-cell adhesion, which has been shown to be in some way associated with the presence of the red corpuscles of primates. This fact probably explains why other workers appear not to have noticed red-cell adhesion in the extreme form we have described in this paper."

[It is difficult to do justice to this long and rather complicated paper in a summary of reasonable length, and those interested should consult the paper in the original.]

W. Y.

TAYLOR (A. W.). **Experiments on the Mechanical Transmission of West African Strains of *Trypanosoma brucei* and *T. gambiense* by *Glossina* and Other Biting Flies.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1930. Nov. 25. Vol. 24. No. 3. pp. 289–303. [9 refs.]

The author has re-examined the question of the mechanical transmission of trypanosomes by various biting insects. His conclusions are as follows:—

" 1. Four strains of *T. brucei* have been successfully transmitted by the direct method, using *G. tachinoides* as mechanical vector.

" 2. Direct transmissions of *T. brucei* by *G. tachinoides* have only been carried out where the interval between the break in the infecting feed and the resumption of the flies' meal on a clean animal does not exceed ten minutes.

" 3. Successful transmission has been effected by as few as four infecting bites.

" 4. Direct transmissions of *T. brucei* by the agency of *G. tachinoides* have only proved successful where the average number of trypanosomes in the peripheral blood of the infected animal exceeds one in five microscopic fields.

" 5. Some difference appears to exist in the direct transmissibility of the three strains of *T. brucei* used.

" 6. Negative results have been obtained in each of fifteen direct transmission experiments in which attempts were made to transmit six strains of *T. gambiense* by the agency of *G. tachinoides*.

" 7. *T. brucei* has been successfully transmitted by *S. calcitrans* by the direct method.

" 8. Experiments in which attempts have been made to employ *A. costalis*, *A. funestus*, *Aedes vittatus*, and *Lyperosia* (sp. ?) as mechanical vectors of *T. brucei* have failed to effect transmissions.

" 9. Dissection and examination of the proboscis of *G. tachinoides* at intervals after an infecting meal, reveals the fact that motile trypanosomes may survive in the proboscis for as long as three hours; and that the maximum number of trypanosomes contained in the proboscis immediately after an infecting meal is often very considerably in excess of 600 when trypanosomes are abundant in the peripheral blood of the infected animal.

" 10. A brief account is given of the behaviour of trypanosomes taken up during an infected blood meal in the proboscis and gut of *Stomoxys*, *A. costalis*, *A. funestus* and *Lyperosia*. In none of these flies do the trypanosomes survive in the proboscis as long, or in such large number, as in *G. tachinoides*."

W. Y.

TAYLOR (A. W.) & LESTER (H. M. O.). **Note on the Effect on the Infection Rate in the Tsetse of mixing Two Strains of Trypanosomes in its Infecting Feeds.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1930. Nov. 25. Vol. 24. No. 3. pp. 305–307. [1 ref.]

Reference is made to a recent paper by LLOYD [this *Bulletin*, Vol. 27, p. 846] in which by mixing two strains of *T. brucei* in the infecting feeds of a series of bred *G. tachinoides* he obtained a considerably higher infection rate than that which resulted from feeding flies on either of the single strains. Attention is recalled to the possible errors arising from the fact that LLOYD used relatively small numbers of flies. The subject is of obvious importance and consequently the authors determined to re-examine it, repeating the technique employed by LLOYD, but using considerably greater numbers of tsetse.

The conclusions are :—

" The above figures indicate that the mixing in the tsetse of two strains of a trypanosome does not tend to produce a higher infection rate in the fly than that which results when the single strains are employed.

" It is thought possible that the large variations in infection rates in the individual groups of flies used by Lloyd were caused by some other factor or factors."

W. Y.

VAUCCEL (M.). Identification du trypanosome d'une infection humaine de laboratoire. [**Identification of the Trypanosome of a Laboratory Infection in Man.**]—*Bull. Soc. Path. Exot.* 1930. July 9. Vol. 23. No. 7. pp. 715–719. [1 ref.]

A detailed account is here given of the work referred to briefly by MESNIL in his recent paper on the adaptation to man of the trypanosomes pathogenic to mammals [this *Bulletin*, Vol. 27, p. 807]. In July 1929 a laboratory assistant at the Pasteur Institute developed violent attacks of fever, and examination of the blood revealed numerous trypanosomes. The patient stated that in the course of his work he had only been concerned with a strain of nagana which was considered as merely pathogenic to animals.

The blood of the patient was inoculated on July 30th, 1929, into two guineapigs which became infected. The strain, which is designated after the patient virus *Emile*, was then maintained by passage through mice. The virulence is of the same order as that of the nagana strain. Serological tests allied the virus *Emile* with *T. brucei*. The serum of a guineapig infected with virus *Emile* taken at the crisis lysed virus *Emile* and *T. brucei* equally, but had no action on *T. gambiense*; the serum of a guineapig infected with *T. brucei* behaved similarly, but that of a guineapig infected with *T. gambiense* lysed this parasite, but not virus *Emile*. Furthermore, the serum of guineapigs infected with *T. brucei* exhibited a protective action against virus *Emile* and that of guineapigs infected with virus *Emile* against *T. brucei*, but neither had any protective action against *T. gambiense*.

The author then examined the protective and curative power of human serum against each of the above three strains and *T. evansi* in mice. It was found that human serum exercised a protective action against *T. gambiense*, but had no curative action. This sensitiveness to human serum was noticed by MESNIL in 1925; the strain in question was isolated from man in 1920. *T. brucei* was definitely more sensitive than *T. gambiense*, but not so sensitive as formerly; it, like *T. gambiense*, had undergone a change, but in the reverse direction. The *Emile* strain was practically insensitive to human serum, whereas *T. evansi* was very sensitive to it.

In conclusion the author notes that the passage through man of the old laboratory strain of *T. gambiense* has conferred on it a new resistance to human serum.

W. Y.

DI DOMIZIO (Giovanni). A proposito dell'esistenza del *Trypanosoma vivax* nell'uomo. [On Human Infection by *Trypanosoma vivax*.]—*Nuova Vet.* 1930. July 15. Vol. 8. No. 7. pp. 7-9. With 2 text figs. [1 ref.]

Arguing from experimental inoculations in a calf the author discusses the case recorded by LAVIER in 1926 of a man infected by *T. gambiense* presenting parasites of the *vivax* form [this *Bulletin*, Vol. 24, p. 953]. A calf was inoculated with *T. brucei* but for 3 months showed no symptoms and was regarded as not having taken the infection. It was then injected with *T. cazalboui* and developed typical acute infection with abundant trypanosomes (*T. cazalboui*) in the blood and gland juice. Inoculations from this animal into dogs and rats caused infection in one of the former and two of the latter, but the trypanosomes were typical *T. brucei* and not *T. cazalboui*, from which the author deduces that the former had remained latent in the calf, especially as dogs, rats, mice, guineapigs, monkeys, etc., are not receptive to the latter (*vivax cazalboui caprae uniforme* group). He interprets LAVIER's case as one of dual infection by *T. vivax* and *T. gambiense*. During the 5-6 days in which the patient was examined *T. vivax* was found, the other remaining latent. His blood being then injected into a monkey and a rat, infection occurred bringing into evidence the latent *T. gambiense*, since these animals are not susceptible to *T. vivax*, and this led LAVIER to the conclusion that *T. gambiense* had presented itself in the form of *T. vivax*.

H. H. S.

CORSON (J. F.). Observations on *Trypanosoma rhodesiense* in Sheep and Goats.—*Jl. Trop. Med. & Hyg.* 1930. Dec. 15. Vol. 33. No. 24. pp. 385-389.

The author describes observations made with the object of studying the effect of continued direct transmission of *T. rhodesiense* through sheep and goats. The work was done in the Mwanza province of Tanganyika Territory, in a place where the nearest tsetse are four miles away. Three strains of *T. rhodesiense* were used; in one the trypanosomes were injected directly into sheep and goats, while in the other two the first injection was into a white rat, from which sheep and goats were infected. Transmission was carried on in sheep and goats by subcutaneous injection of infected blood. There were no essential differences in the behaviour of the three strains, and consequently the author contents himself with describing in detail the

behaviour of one of them. Details are summarized in two lengthy tables. A third table shows the effect of subinoculation of white rats, and in Table IV details are given of the injection of normal human serum into some of the infected rats, and the results are shown in Table V.

There was no noticeable change in the infectivity and virulence of the strains throughout the period it was maintained in sheep and goats. No difference was observed in the mortality of the parasites in subinoculated rats. Posterior nuclear forms appeared in characteristic numbers at the end of the period as at the beginning.

The duration of life varied somewhat in animals, especially sheep, infected with the same strain at the same time. Sheep appeared to stand the disease better than goats, but all the infected animals died, mostly within two months from the date of inoculation.

Sixteen infected rats were injected with serum from apparently healthy persons, 12 different sera being used; 13 of the rats had been infected from sheep and goats and the other 3 directly from patients. The trypanosomes from sheep and goats showed, on the whole, a somewhat greater susceptibility to the action of normal human serum than did those coming directly from man.

The following summary is given:—

"(1) The characters by which *T. rhodesiense* is distinguished from *T. gambiense*, such as high infectivity and virulence for laboratory animals, rapid multiplication and the occurrence of numerous posterior-nuclear forms in the blood of these animals, were preserved by the trypanosome during maintenance for six months in sheep and goats. The trypanosomes showed also, on the whole, a somewhat greater susceptibility to the action of normal human serum, when tested in subinoculated white rats, than was shown when rats were directly infected from man.

"(2) * So far as can be judged from these direct passage experiments, a herd of sheep and goats can remain infected with *T. rhodesiense* for at least several months and possibly throughout its existence as a herd, where opportunities occur for the transmission of the infection.

"(3) The animals are infective throughout the course of the disease, which is short and acute."

W. Y.

VASSILIADIS (P.) & JADIN (J.). Influence de l'hibernation sur le *Trypanosoma rhodesiense*. [**Influence of Hibernation on *T. rhodesiense*.**] —*Ann. Soc. Belge de Méd. Trop.* 1930. June 30. Vol. 10. No. 2. pp. 129–131. [5 refs.] [Bact. Lab., Univ., Louvain.]

A summary is given of the previous work of BLANCHARD and BLATIN (1907), of BRUMPT (1908), and of others on this subject. The authors themselves have worked with the dormouse (*Myoxus nitela*) and with *T. rhodesiense*. Two animals were inoculated with similar numbers of trypanosomes and the one was placed in the ice-chest and the other kept in the laboratory. The latter animal showed parasites in the blood in 2 days and died on the 10th day, whereas the blood of the former remained negative up to the 10th day, when it was transferred from the ice-chest to the laboratory; five days later parasites were found in the blood. Two days later—when the blood showed a couple of trypanosomes per microscope field—the animal was returned to the ice-box and after a further six days the parasites had completely disappeared from the blood. When, after a month of hibernation, the dormouse was again transferred to the laboratory, it was found to be cured. Sixteen days later it was re-

* Italics not in original.

inoculated with *T. rhodesiense* and was found to possess a certain degree of immunity in that the infection resulting ran a much more chronic course than that in control animals.

W. Y.

VASSILIADIS (P.). L'action du sérum humain sur les trypanosomes. [The Action of Human Serum on Trypanosomes.]—*Ann. Soc. Belge de Méd. Trop.* 1930. June 30. Vol. 10. No. 2. pp. 117-122. [11 refs.] [Bact. Lab., Univ., Louvain.]

The author has studied the action of human serum in wild white rats and in *Mus rattus* and *Mus decumanus* infected with *T. pecaui* and *T. rhodesiense*. The dose of human serum was 0.5 cc. for mice of 15 gm. and 1.5 cc. for rats of 200 gm. The results obtained confirm those of previous investigators. Human serum similarly cleared the blood of guinea-pigs infected with *T. rhodesiense* when given in doses of 2.5 cc. per 250 gm. of body weight.

The disappearance of parasites following the injection of human serum is, however, only temporary; further injections are followed by similarly temporary disappearance of parasites up to a point after which injections of human serum are without action. Vassiliadis then refers to the hypothesis of ROSENTHAL and his co-workers [this *Bulletin*, Vol. 19, p. 154 and p. 520; Vol. 20, p. 337 and p. 700; Vol. 22, p. 143 and p. 537; and Vol. 27, p. 238] that human serum is itself inactive, but is activated by the reticulo-endothelial system of the injected animal. After repeated injections of human serum, the reticulo-endothelial system becomes exhausted and consequently no longer able to activate human serum. Vassiliadis performed a number of experiments which he believes afford support to this hypothesis. [In the reviewer's opinion ROSENTHAL's and Vassiliadis' experiments are explicable on quite other grounds and in no way support ROSENTHAL's hypothesis, which, for the reasons stated in a paper by the reviewer and his colleagues, the reviewer believes to be incorrect (this *Bulletin*, Vol. 27, p. 804).]

Vassiliadis obtained a serum-fast strain of *T. rhodesiense* and has studied the action of tryparsamide and of tartar emetic on this strain. He found that the serum-resistant character, which normally is preserved through numerous mouse passages, is quickly lost under the influence of tryparsamide, but is not modified by treatment with tartar emetic.

W. Y.

NATTAN-LARRIER (L.) & NOYER (B.). Ultrafiltration et pouvoir trypanocide du sérum humain. [Ultrafiltration and Trypanocidal Power of Human Serum.]—*C.R. Soc. Biol.* 1930. Dec. 5. Vol. 105. No. 33. pp. 630-632. [4 refs.]

In a previous paper the authors have shown that the trypanocidal substance of human serum is arrested by the placenta, as is also alexine and, in a general way, all natural antibodies. LEVADITI and NICOLAU found that alexine cannot traverse colloidal membranes, and the authors determined to ascertain whether this was likewise true of the trypanocidal substance.

For the preparation of the membrane collodion of the Codex types E and F were employed in the following mixtures:—

Collodion	Nitroglycerine	Ether	Alcohol 95 per cent.
E	2.5 gm.	35 gm.	47 gm.
F	2.5 gm.	35 gm.	35 gm.

From these collodion sacs of two layers were prepared according to Malfitano's technique and mounted on glass tubes. The filtrations were made by aspiration at a pressure not exceeding 15 to 20 cm. of mercury.

Two experiments are described in detail, from which it appears that although the alexine is completely held up by the membrane, the trypanocidal substance readily passes through it.

W. Y.

LOCATELLI (Piera). Sur l'action pathogène des trypanosomes tués. [**Pathogenic Action of Dead Trypanosomes.**]—*C.R. Soc. Biol.* 1930. Nov. 21. Vol. 105. No. 31. pp. 452-454.

The mechanism of the pathogenic action of trypanosomes is still little known. The author has enquired whether the injection into animals of the bodies of dead trypanosomes could produce lesions comparable with those seen in experimental trypanosomiasis. He had previously found in infected guineapigs pronounced and constant alterations in the megakaryocyte and leucocyte system in the bone marrow, and grave lesions in the islands of Langerhans; consequently he chose guineapigs as the experimental animals in the present work.

Five guineapigs were given massive doses of trypanosomes obtained by centrifuging the blood of heavily infected guineapigs or rats. After washing the parasites in physiological saline, a few drops of distilled water were added and the emulsion kept 48 hours at 0° C., so as to avoid the possibility of any parasite being still alive. The emulsion was made isotonic by the addition of the necessary quantity of concentrated salt solution and was then injected.

Notwithstanding the fact that every care had been taken to preserve sterility, two of the guineapigs died within a few days of peritonitis. The remaining three animals died 13, 16, and 25 days respectively after the first injection; two of them had received the trypanosomes from 30 rats, and one those from 17 guineapigs, in 5 or 6 injections. The injections were followed by shock and the animals steadily lost weight.

A detailed account of the post-mortem findings is given from which the author concludes that the bodies of trypanosomes contain a substance which, when injected in massive doses—comparable to the quantity of trypanosomes which are destroyed in the course of an experimental infection—has the power of causing the death of the animal and of producing the pathological changes which are habitually found in guineapigs which have died of experimental trypanosomiasis. [This paper should be compared with the author's previous article, this *Bulletin*, Vol. 27, p. 243.]

W. Y.

ANDREWS (Justin), JOHNSON (Carl M.) & DORMAL (V. J.). **Lethal Factors in Experimental Infections of *Trypanosoma equiperdum* in Rats.**—*Amer. Jl. Hyg.* 1930. Sept. Vol. 12. No. 2. pp. 381-400. [24 refs.] [School of Hyg. & Public Health, Johns Hopkins Univ., Baltimore.]

Investigations were undertaken with the object of discovering the lethal mechanism by which *T. equiperdum* kills its experimental rat host.

"To conclude, it is believed that *T. equiperdum* causes the death of the rat host into which it is experimentally introduced by asphyxiation. This is brought about by pulmonary edema due to partial obstruction of the circulation by the agglutination of the trypanosomes in the heart and lungs. The consequent anoxemia leads to a non-volatile uncompensated acidosis, and to central necrosis of the liver, interfering with both its glycogenic and glycogenolytic functions and ultimately producing a hypoglycemia."

W. Y.

HARTMANN (E.). Die Verweildauer von stammspezifischen Trypanosomenantikörpern im Kaninchen und die Bedeutung des Antikörpergehaltes für den Ausfall homologer Reinfektionen. [**The Persistence of Strain-Specific Trypanosome Antibodies in Rabbits and the Significance of the Antibody Content in the Occurrence of Homologous Reinfection.**—*Ztschr. f. Immunitätsf. u. Experim. Therap.* 1930. Vol. 68. No. 5/6. pp. 518-530. With 3 text figs. [Skin Clinic, Univ., Munster i.W.]

Reference is made to the previous work of the author on the question whether chancre immunity occurs in superinfection with trypanosome strains which are the relapse variants of the original strain. In this work it was shown that the relapse strain and original strain behave as heterologous strains, infection with one preventing chancre formation on superinfection with the same strain, but not with the other [this *Bulletin*, Vol. 27, p. 851].

In the present work Hartmann has enquired what is the duration of the strain-specific antibody in the animal, and whether the possibility of homologous reinfection is dependent on the antibody titre and whether it may manifest itself as a latent infection. The strain Nagana-Prowazek was employed. The rabbits were inoculated subconjunctivally, subcutaneously in the scrotum or prepuce, or at the entrance to the vagina. The number of parasites injected was apparently immaterial. As a rule the primary effect, with well-defined regional enlarged lymphatics, was fully developed by the fifth day. All the animals were cured by an injection of neosalvarsan (33 mgm. per kilo. of body weight) the day after the appearance of the relapse strain in the blood.

The determination of the presence of antibody was made by the method described by STÜHMER. Each time blood was removed from the rabbit for the antibody test, it was reinoculated with the homologous strain. Certain type experiments are described in detail. The paper, which is rather technical, should be consulted in the original by those interested.

The following are the conclusions :—

The period of persistence of the strain-specific trypanosome antibody after active immunization was in 18 rabbits between 17 and 31 weeks; after passive immunization it was only a few days.

The possibility of homologous reinfection of cured animals with chancre formation is dependent on the titre of the antibody. An homologous reinfection is usually possible with a titre between 1.0 and 0.5.

Latent infections are not seen as the result of reinfections.

W. Y.

GEIGER (A.), KLIGLER (I. J.) & COMAROFF (R.). **The Glycolytic Power of Trypanosomes (*Trypanosoma evansi*) in Vitro.**—*Ann. Trop. Med. & Parasit.* 1930. Oct. 22. Vol. 24. No. 3. pp. 319–327. [8 refs.] [Dept. of Hyg. & Bact., Hebrew Univ., Jerusalem.]

The nature of the metabolism of trypanosomes and its effect on the infected host is still a subject of controversy. One view is that the pathological changes are due to a toxin elaborated by the trypanosomes, while the other attributes the results to a depletion of the glucose and glycogen reserves.

In a previous paper the authors have pointed out that the blood of an infected rat contains an abnormal concentration of lactic acid, which increases progressively with the development of the infection; they believe that this progressive production and accumulation of lactic acid leads to a progressive depletion of the alkali reserve, the process ultimately resulting in death from acidosis.

In the present work an attempt was made to test the validity of this hypothesis by ascertaining the rate of glucose utilization and of lactic acid production by trypanosomes, under controlled conditions *in vitro*.

The following are the conclusions:—

" *T. evansi* consumes dextrose *in vitro* with great avidity with the production of lactic acid.

" It is suggested that this metabolic characteristic plays a significant rôle in the pathology of the disease, finding its most striking manifestation in the rat, where trypanosome development progresses almost unhindered during the later stages of the infection "

[The findings regarding the enormous quantity of glucose consumed by trypanosomes agree with those of the reviewer and his colleagues (this *Bulletin*, Vol. 27, p. 237).]

W. Y.

REGENDANZ (P.). Der Zuckerverbrauch der Trypanosomen (nach Versuchen *in vitro* bei 37° C) und seine Bedeutung für die Pathologie der Trypanosomeninfektionen. [**The Sugar Consumption of Trypanosomes (seen in *in vitro* Experiments at 37° C.) and its Significance for the Pathology of Trypanosomal Infections.**]—*Zent. f. Bakt.* I. Abt. Orig. 1930. Sept. 30. Vol. 118. No. 3/4. pp. 175–186. [23 refs.] [Inst. for Ship & Trop. Diseases, Hamburg.]

The author has repeated the work of the reviewer and his colleagues who showed that trypanosomes living in serum diluted with Ringer-glucose solution at 37° C. consumed a relatively enormous quantity of glucose. Using the same technique, he determined the sugar consumption of *T. rhodesiense*, *T. congolense* and *T. lewisi*; his results corresponded closely with those of the reviewer [this *Bulletin*, Vol. 27, p. 237]. After discussing his numerous experiments in detail, the author considers the significance of the phenomenon for the pathology of trypanosomal infections. He points out that in infected man and the larger animals the number of parasites in the peripheral blood is as a rule very small; moreover, in rats infected with *T. lewisi* the

sugar consumption causes apparently little harm, notwithstanding the facts that in this infection large numbers of the parasites can be found in the blood for a considerably longer period than in the case of infections with the pathogenic trypanosomes, and that the non-pathogenic *T. lewisi in vitro* consumes just as much glucose as do the pathogenic forms. Similarly, if it is borne in mind that in the pathogenic infections of rats the trypanosomes are present in large numbers only about two days before death, and consequently the period during which large quantities of sugar is being consumed is very limited, it appears probable that the mere consumption of sugar hardly suffices to explain the death of the host.

The following are the conclusions :—

The loss of sugar in serum blood mixtures containing trypanosomes—*T. rhodesiense*, *T. congolense* or *T. lewisi*—at 37° C. was studied.

The sugar consumption in these mixtures is in great part due to the metabolism of the trypanosomes. Dead or dying trypanosomes cause no loss of sugar.

The sugar consumption of trypanosomes at 37° C. is considerable.

No differences were discovered in the amount of sugar consumed within 4 hours at 37° C. by the pathogenic trypanosomes on the one hand and *T. lewisi* on the other.

W. Y.

LOCATELLI (Piera). Sur le métabolisme du glucose dans la trypanosomiase. [**Metabolism of Glucose in Trypanosomiasis.**]—*C.R. Soc. Biol.* 1930. Nov. 21. Vol. 105. No. 31. pp. 449-451.

The author has estimated the blood sugar in guineapigs and rabbits infected with *T. equiperdum*. In two guineapigs the infection was progressive, without trypanolytic crisis, up to the death of the animals on the 22nd and 26th days, respectively. During the incubation period the blood sugar varied from 90 to 100 mgm. per 100 cc.; after the appearance of parasites it fell sometimes as low as 60 mgm. and in one of the animals half an hour before death it was only 34 mgm.

In three guineapigs infected from rats there were definite trypanolytic crises and during these the blood sugar increased towards normal; in two of them, which exhibited fairly long preagonal convulsions, the blood sugar fell to 0.38 and 0.41 mgm., respectively.

In rabbits the disease developed rather differently. In one animal in which only scanty parasites were found in the blood the sugar values were 90 to 120 mgm., and similar values were obtained in a second animal which had numerous parasites in its blood. A third rabbit gave values of 90 to 98 mgm. during the rather long incubation period, and 90 to 93 mgm. during the period that the blood contained numerous trypanosomes and only 18 mgm. during the agonal period.

The author correlates these changes in the blood sugar with degenerative lesions which he has regularly found in the islands of Langerhans in the pancreas of infected guineapigs. These lesions are described in detail. It appears that the islands of Langerhans are, at least in the guineapig, particularly sensitive to trypanosomal infections. [Possibly, as the author believes, these pancreatic lesions have something to do with the fall in the blood sugar values in experimental trypanosomiasis, but it is probably also necessary to take account of the enormous sugar consumption of the trypanosomes themselves, as has been shown by the reviewer and his colleagues (this *Bulletin*, Vol. 27, p. 237).]

W. Y.

KLIGLER (I. J.), GEIGER (A.) & COMAROFF (R.). **Effect of the Nature and Composition of the Substrate on the Development and Viability of Trypanosomes.**—*Ann. Trop. Med. & Parasit.* 1930. Oct. 22. Vol. 24. No. 3. pp. 329-345. With 3 charts in text. [4 refs.] [Dept. of Hyg. & Bact., Hebrew Univ., Jerusalem.]

After various unsuccessful attempts to grow trypanosomes *in vitro*, the authors decided to ascertain first the influence of various conditions of the substrate, such as pH, osmotic pressure, oxygen tension, etc., on their viability and multiplication.

The results of their experiments suggest the following conclusions:—

" 1. *T. evansi* is sensitive to hydrogen ion concentration. The optimum pH is on the alkali side (probably 7.4); the limiting pH is between 6.3 to 6.4; while the inhibiting pH is probably near 6.8.

" 2. *T. evansi* requires a minimum concentration of glucose, about 0.1 per cent. In the presence of oxygen the glucose is rapidly fermented with the production of lactic acid.

" 3. *T. evansi* is aerobic; it survives longer under anaerobic than under aerobic conditions, but activity is greatly inhibited as evidenced by the acid production.

" 4. The optimal osmotic pressure is that of the tissues rather than that of the blood; 0.08/m. to 0.1/m. or $\frac{1}{4}$ physiologic solution being more favourable than 0.12/m.

" 5. NaCl. is more toxic than Na-Lactate; the inhibitive effect of lactic acid is due, therefore, to the hydrogen ion concentration rather than the lactate.

" Since the completion of these experiments, Yorke, Adams and Murgatroyd (1929) published data which emphasise the significance of these results. These authors found that the survival of trypanosomes for any length of time is conditioned by their number. If the initial number of trypanosomes is large they die more rapidly than when the initial number is small. This difference is undoubtedly due to the more rapid acidification of the medium by the large number of organisms.

W. Y.

DOMINICI (Ada). **Relazione fra concentrazione ionica e potere tripanocida del sangue normale e del sangue di cavia tripanosomizzata. Ricerche sperimentali. [Relation between the Ionic Concentration and Trypanocidal Power of Normal Blood [of Rabbits and Guineapigs Blood of Guineapigs infected with Trypanosomes].**—*Boll. Istituto Sieroterap. Milanese.* 1930. Aug. Vol. 9. No. 8. pp. 438-441. [4 refs.] [Hyg. Inst., Univ., Palermo.]

As regards the trypanocidal effect of normal blood the author found that when the reaction was between pH 6.8 and 6.4, there was no result during the first two hours of contact, but that after 8 hours' contact the trypanocidal action was quite definite. When the plasma was rendered more alkaline, pH 7.8-8.4, the trypanocidal power was much increased. *T. brucei* and *T. lewisi* were the species used.

In the second part of the experiment the author noted the pH of the plasma at four periods after the guineapigs had been inoculated with *T. brucei*: (1) At the beginning of infection before any trypanosomes are seen in the peripheral blood and before there is any loss of weight, i.e., four or five days after inoculation, the pH of the plasma is 7.2-7.3. (2) When trypanosomes begin to appear in the peripheral blood, the temperature starts to rise and swelling of lymph glands is visible (6-10th day), the pH was 7. (3) The period of "trypanolytic crisis" when the parasites disappear temporarily from the peripheral blood and settle in the internal organs (liver, spleen and lymph spaces), 10-14th day. (4) Late stages

with considerable loss of weight and trypanosomes are abundant in the peripheral blood. By this time the pH has come down to 6.6, and the animal is moribund. In other words, a fall in pH is accompanied by lowering of trypanocidal power, as shown by experiment and in the ordinary course of the infection.

H. H. S.

LINTON (Richard W.). **A Comparison of the Chemical Alterations in the Blood of Rats infected with Pathogenic and Non-pathogenic Trypanosomes.**—*Jl. Experim. Med.* 1930. Nov. 1. Vol. 52. No. 5. pp. 695–700. [5 refs.] [College of Physicians & Surgeons, Columbia Univ., New York.]

"Blood samples from rats infected with *Trypanosoma lewisi* give normal values for lipid phosphorus, lecithin, CO₂ combining capacity, and liver glycogen.

"When these results are compared with the results of similar experiments with *T. equiperdum* infections, on the basis of the concentration of trypanosomes in the blood, it is found that the pathogenicity of the latter organism does not depend upon its numbers as affecting the blood, but that it must be in some other way injurious to the host. Whether the injury is due to a true toxin, an endotoxin, or mechanical interference is not yet known."

W. Y.

VILLELA (Eurico). Da occurencia da Doença de Chagas nos hospitaes de Bello Horizonte e na população de seus arredores. [**Chagas's Disease in the Hospitals of Bello Horizonte and the Neighbouring People.**]*Folha Med.* 1930. July 15. Vol. 11. No. 20. pp. 229–235. With 15 text figs. (1 map). [3 refs.]

The author examined 186 individuals presenting symptoms suggestive of Chagas's disease either by search for the parasite or by complement fixation. Search for the parasite was made in five ways: direct blood examination, section of tissues taken in life for the presence of leishmanial forms, haemoculture and xenodiagnostic methods, or by inoculation of a susceptible animal with the blood of the patient. Of the total examined 53 or 29 per cent. gave a positive complement fixation. A map is given [unfortunately on so small a scale that it conveys but little information] intended to show the localities of persons infected, and also sphygmographic tracings of some of the cardiac forms of the disease; photographs of goitrous cases are reproduced [one of which we recollect having performed the service for previous papers, the patient apparently thoroughly enjoying the process]. Sufficient evidence is produced to demonstrate that Bello Horizonte (Minas Geraes) is definitely an endemic focus of American trypanosomiasis.

H. H. S.

CHAGAS (Evandro). Forma cardiaca da Trypanosomiasse Americana. [**The Cardiac Form of American Trypanosomiasis.**]*Mem. Inst. Oswaldo Cruz.* 1930. Oct. Vol. 24. No. 3. pp. 89–125. With 79 figs. on 20 plates.

This article is a useful summary of previous papers on the subject by the same author (see this *Bulletin*, Vol. 25, p. 789, and Vol. 27, p. 838), together with 20 plates, depicting the trypanosome, the

Triatoma megista, the pathological condition produced in the heart in the acute and chronic forms, the physical signs and sphygmographic tracings of the various disturbances of rhythm. Fifty-nine of these are reproduced; the majority are clear but some are too small for study without a lens. [Unfortunately there is no list of references but this article does not appear to contain anything not already summarized in this *Bulletin*.]

H. H. S.

ZUCCARINI (J. A.). Etudes expérimentales sur le *Trypanosoma cruzi*. [Experimental Studies on *T. cruzi*.]—C.R. Soc. Biol. 1930. Oct. 16. Vol. 105. No. 27. pp. 113–115. [1 ref.]

MAGGIO and ROSENBUSCH, and KRAUS and ROSENBUSCH failed to find human beings infected with *T. cruzi* in the Argentine, but since 1924, MÜHLENS and others have succeeded. KRAUS and ROSENBUSCH explained the rarity of human cases and the absence of symptoms on the hypothesis that in Argentina the virus is attenuated.

Zuccarini states that the facts are as follows:—

1. *T. cruzi* in man has only been found accidentally in examinations made for malaria.
2. An experimental infection has been produced in man (Mühlens) by inoculation of a strain obtained from man or from indigenous *Triatoma*.
3. The white mouse is the most sensitive experimental animal.
4. No less than 13 species of *Triatoma* are found in Argentina.
5. The index of infection of the intestine of *Triatoma* is high.
6. Carriers of the infection have been found among dogs and armadillos (*Dasybus hybridus*).

The author records the results of infecting mice, guineapigs and rabbits with various strains of the parasite isolated in the Argentine—the first from a *Triatoma*, the second from man, the third from a *Triatoma*, and the fourth from a child.

No definite differences were found in the receptivity of new-born and adult guineapigs. The infection proved fatal in young mice and rabbits, and was more certainly fatal in new-born animals than in those somewhat older.

W. Y.

ROBERTSON (Andrew). Note on a Trypanosome Morphologically Similar to *Trypanosoma cruzi* Chagas, 1909, found in an Opossum, *Didelphis marsupialis*, captured at Tela, Honduras, Central America. —Eighteenth Ann. Rep. Med. Dept. United Fruit Company, Boston, Mass. 1929. pp. 293–310. With 9 figs. [24 refs.]

The following summary is given:—

- " 1. *T. cruzi* Chagas, 1909 was isolated from the blood of an opossum, *Didelphis marsupialis* captured at Tela, Honduras.
- " 2. The trypanosome forms in the blood were morphologically similar to *T. cruzi* except that in some the nucleus was rather nearer the anterior or flagellar end of the body.
- " 3. The developmental stages of the parasite were found in the heart muscle of the opossum.
- " 4. *Cimex rotundatus*, the local bed bug or "chinche" of Honduras was successfully infected by feeding on the opossum. The *Cimex* were still infected three months later.

"5. A guineapig was successfully inoculated with blood from the opossum. The blood forms were identical with those from the opossum. The infection in the guineapig was transient lasting from two to two and a half weeks.

"6. A guineapig was inoculated with the infected dejecta of the *Cimex* and developed an infection in the peripheral blood one month from the date of inoculation.

"7. The organism was isolated in culture (on Wenyon's modification of Noguchi's blood agar medium) and the forms in culture corresponded closely to those in culture of a known strain of *T. cruzi*.

"8. An experimental guineapig showed trypanosomes in its blood one month after inoculation with the cultural forms. The infection also proved to be a transient one lasting for 21 days.

"9. Tela, Honduras is some 2,000 miles distant from what has hitherto been regarded as the endemic zone of this form of trypanosomiasis."

W. Y.

DIAS (Emmanuel). Da presença de formas de evolução do *Trypanosoma cruzi* Chagas, nos tubos de Malpighi do barbeiro. (Nota prévia.) [**Evolution Forms of *Trypanosoma cruzi* in the Malpighian Tubes of *Triatoma megista*.**—*Mem. Inst. Oswaldo Cruz*. 1930. Oct. Vol. 24. No. 3. pp. 183-185. With 3 plates.

The author dissected numerous specimens of the vector of American trypanosomiasis, fixed the parts in a modified Schaudinn's fluid, mounted them in paraffin and cut serial sections. In addition to the forms already described by CHAGAS, BRUMPT and others, as present in the stomach and intestine, the author found in some of the specimens crithidial forms in large numbers in the Malpighian tubes, especially congregated in the swollen terminal portion, as depicted in the plates which accompany the paper.

H. H. S.

MAURICE (G. K.). **The History of Sleeping Sickness in the Sudan.**—*Jl. Roy. Army Med. Corps*. 1930. Sept. & Oct. Vol. 55. Nos. 3 & 4. pp. 161-174; 241-259. With 5 text figs., 1 map & 1 chart.

This article is an interesting and popular account of the history of sleeping sickness in the Sudan; it contains nothing new and requires no special notice.

W. Y.

SICÉ (A.) & BOISSEAU (R.). Trypanosomiase humaine associée à différentes infections. [**Human Trypanosomiasis associated with Other Infections.**—*Bull. Soc. Path. Exot.* 1930. Dec. 10. Vol. 23. No. 10. pp. 1011-1014. [3 refs.] [Pasteur Inst., Brazzaville.]

Clinical accounts are given of three cases of sleeping sickness in which the condition was complicated by the development of secondary infections, viz., leprosy, amaas and tetanus, respectively.

W. Y.

MESNIL (F.). Sur l'adaptation des trypanosomes à l'homme. [**Adaptation of Trypanosomes to Man.**—*Bull. Soc. Path. Exot.* 1930. July 9. Vol. 23. No. 7. pp. 719-721. [4 refs.]

This article has already been published elsewhere and fully noticed in this *Bulletin* (Vol. 27, p. 807).

W. Y.

PLAGUE.

THORNTON (Edward N.). **A Report on an Investigation into Plague in the Protectorate of Uganda.**—pp. iv+33. 1930. Entebbe.

This Report gives the results of an enquiry into the plague conditions of Uganda during a visit to that country in June and July 1930 by the author.

There have been 52,907 reported deaths in the period from 1910 to 1930; the numbers range from 531 in 1924 to 5,199 in 1929. The reported cases of plague are mostly bubonic but it is believed that a considerable number of deaths from septicaemic and pneumonic plague have escaped record. The disease is chiefly prevalent after the heavy rains.

The spread of plague during the past 24 years has been mainly associated with the ramifications of the cotton industry. The problem is essentially a rural and not an urban one, since cotton, which is the chief agricultural product in Uganda, is cultivated by the natives on many thousands of small plots scattered over the country. The primitive conditions of life in the rat-infested native huts and an excellent modern system of communications form a combination of circumstances which favours the spread of plague not only within but beyond the confines of the country. The author of the Report thinks that a co-ordinated survey of plague in this region of East Africa, including Kenya Colony and Tanganyika Territory, should be undertaken.

The natives have come to regard the roof-rat, a local variety of *R. rattus*, as the distributor of the infection, and this is undoubtedly the common plague rodent to-day in Uganda. *R. couchae ugandae*, which is also a house-rat, has been associated with plague outbreaks in the past, and *Arvicanthis abyssinicus*, a field rodent, has also been found infected with plague. The rôle of other field rodents is uncertain but is under suspicion.

X. cheopis and *X. brasiliensis* are the chief fleas that infest the rodents. The latter species is the one most commonly found on rodents in the country districts, where, on the contrary, *X. cheopis* is relatively rare. In Kenya Colony, likewise, *X. brasiliensis* is the common flea on rats caught in native huts, and *X. cheopis* is more numerous on the rodents in towns. The meteorological conditions in Uganda are stated to be exceptionally favourable for the multiplication of fleas, and incidentally too for the infestation of native huts by rats, and for the spread of plague in general. The Medical Officer of Health for Kisumu in Kenya, in an investigation which lasted from August 1926 to July 1927, found that rat-fleas were carried both in hides and in bags of cotton seed. The examination of 1,434 bags of cotton seed from Uganda gave an average of 11.5 per 100 bags; these included 9 *X. brasiliensis*, 154 *X. cheopis*, 1 *P. irritans*, and 1 *C. felis strongylus*.

Anti-plague inoculation is not unpopular, but the author of the Report recommends that inoculation should be restricted to close contacts of patients, the occupants of premises in which plague-infected rodents have actually been found, and the disinfecting staff. He thinks that the quarantining of patients is necessary in order to obviate risk from a terminal plague pneumonia, but that the quarantining of contacts is not justified; the unpopularity of this measure limits its value. He suggests as a substitute for burning and de-thatching,

which are unpopular measures, treatment of the infected native huts by "cyanogas" dust. This substance is stated by the manufacturers to be calcium cyanide, which, on exposure to air, gives off hydrocyanic acid gas, leaving a harmless residue of slaked lime. The laying, with due precautions, of baits of strychnine-poisoned wheat is recommended as being a most effective rodent-killing agent in areas where wheat is not grown. Notes on the method of applying "cyanogas" dust and on poisoned baits for rodents are given in two appendices. [The inclusion of a sketch map of Uganda and the adjoining territories would have made the topographical references more readily intelligible to the reader.]

G. F. Petrie.

DANY (G.). Quelques considérations sur l'épidémie de peste du Sous (Mars-Août 1929). [**Plague in Sous.**]—*Rev. Méd. et Hyg. Trop.* 1930. Nov.-Dec. Vol. 22. No. 6. pp. 261-265. [2 refs.]

This paper refers to 357 cases of plague which were seen in Sous from March to August 1929. This did not include all the cases, as it was difficult to obtain accurate statistics. In the main it was an epidemic of bubonic plague. In one small area cases of pneumonic plague occurred, all rapidly fatal. There were also patients with septicaemic plague who died in two or three days without buboes, but showing many painful glands. Some rats were examined by Dr. DIOR and by the late Dr. AURIAT, and found to be infected; but there was no plague among other rodents very common in the district.

J. H. Tull Walsh.

CAZANOVE. Recherches sur les causes de la persistance de la peste au Sénégal. [**Causes of Persistence of Plague in Senegal.**]—*Bull. Office Internat. d' Hyg. Publique.* 1930. Nov. Vol. 22. No. 11. pp. 2103-2107.

This investigation began in January 1929 under the Director of the Laboratory of Bacteriology of Senegal at Saint-Louis. A motor-car was employed for travelling through the villages. Tables are given of the rodents and fleas found in the districts visited. About 3,000 rodents were examined; only six showed plague bacilli. The rodent concerned was *M. rufinus*, caught in two villages. One of these villages was free from plague; in the other there were two cases. Of the large number of fleas captured, 105 were *X. astia*. All the rest were *X. cheopis*.

J. H. T. W.

i. GRAHAM (J. D.). La peste dans l'Inde Britannique. [**Plague in British India.**] (I. Recherches sur la peste, faites à l'Institut Haffkine, de Bombay [ANDERSON & DUNN]. II. Résumé des travaux accomplis au cours des recherches sur les puces des rats dans la Présidence de Madras [RUSSELL, KING & PANDIT]. III. Etude sur les puces du rat dans le Port et la Ville de Rangoon [JOLLY].)—*Bull. Office Internat. d' Hyg. Publique.* 1930. Nov. Vol. 22. No. 11. pp. 2088-2098. [3 refs.]

ii. —. Documents statistiques sur la peste dans l'Inde Britannique. —*Ibid.* pp. 2099-2100. With 2 charts.

i. A useful anti-plague serum was obtained by Dr. NAIDU from rabbits injected with *Past. pestis*. Larger quantities were obtained

from sheep and calves. These sera were tested on rats and rabbits and the results were sufficiently encouraging to justify their application to man on a large scale. Experiments were made on the transmission of plague by *X. cheopis*, *X. astia* and *X. brasiliensis* in Bombay, and all three were shown to be transmitters of plague. Similar investigations were made on rats and fleas in Madras and Rangoon [this *Bulletin*, Vol. 24, p. 932 (GOYLE)]. The chemotherapy of plague was studied and it was found that parachloromercuro-phenol destroyed *Past. pestis*, *in vitro*, in a dilution of 1 in 400,000,000, in 24 hours. Other work was done on immunity and on the biological reactions of *Past. pestis*. Cereals in various places were examined in order to discover how far they were infested with fleas or flea larvae. Only on two occasions was infestation discovered.

ii. Contains a chart of plague—1896–1927—and one showing the distribution of plague by Provinces—1897–1927.

J. H. T. W.

DE FIGUEIREDO (J. M. Pacheco). Relatório dos serviços executados na peste pneumónica em Nagoá e Raçaim. [**Measures against Pneumonic Plague at Nagoá and Raçaim (Portuguese India).**]—*Bol. Ger. Med. e Farmacia*. Bastora. 1930. Jan.–Sept. Ser. 14. Nos. 1–9. pp. 59–71.

A small outbreak of pneumonic plague occurred in April [? 1930] in Portuguese India. As usual, the earliest case was bubonic, death being due to pulmonary complications, and again as usual the early cases were wrongly diagnosed. The first, bubonic, patient was thought to be suffering from "erysipelas and lymphangitis"; the first pneumonic patient, a man of 60 years, was thought to have died of senile debility and bronchitis, and subsequent patients from remittent fever or influenzal pneumonia. Alarm at the suddenness of these deaths led to a delegate being sent from Salsette, and he, seeing a patient very ill with broncho-pneumonia and copious haemorrhagic sputum, had cultures made and *Past. pestis* was found in abundance. Steps were immediately taken; patients and 138 contacts were isolated, anti-plague serum obtained from the Pasteur Institute was injected into 47 of the latter in doses of 10 or 20 cc. Some of the patients were isolated in their homes, and the districts were divided into zones each with a military cordon to prevent intercommunication. The usual disinfecting procedures were also carried out. The success of the measures taken is evidenced by the fact that the total attacked was 6, of whom 3 died.

H. H. S.

LONG (John D.). **Anti-plague Campaign in Guayaquil and Vicinity.**—*Public Health Rep.* 1930. Nov. 21. Vol. 45. No. 47. pp. 2880–2887. [1 ref.]

This report deals with the destruction of rats by trapping, etc. In November 1929 one rat in 150 was infected with plague. The last plague rat was found on March 26th, 1930. 6,500 rats have since been examined without finding any infection among them. Plague has been present in Guayaquil for 22 years and over 7,200 cases have been recorded; but the port of Guayaquil is no longer a menace to other countries through international commerce. "If by October 1st,

1930, no further cases of human or rat plague shall have occurred the port of Guayaquil may be reported to the Pan-American Sanitary Bureau, in accordance with the terms of the Pan-American Sanitary Code, as a 'clean port' of Class A."

J. H. T. W.

ANDO (K.), KURAUCHI (K.) & NISHIMURA (H.). **A New Plague Endemic Area in the North-Eastern Part of Inner Mongolia. Plague Studies I.**—*Kitasato Arch. Experim. Med.* 1931. Jan. Vol. 8. No. 1. pp. 24–38. With 1 chart in text. [12 refs.] [Kitasato Inst. for Infect. Diseases, Tokyo.]

A description is given of a plague infection which was in all probability a new one for the area concerned and which dated from about the year 1924. The reports indicate that there had been present every summer an infectious disease with bubo, headache and high fever which destroyed sometimes whole families and sometimes hamlets. There is reason to suppose that the animal concerned in transmission was the suslik rather than the rat.

W. F. Harvey.

LEAGUE OF NATIONS MONTHLY EPIDEMIOLOGICAL REPORT. 1930. May 15. Vol. 9. No. 5. pp. 203–218. With 5 maps & 1 chart. —**General Review. Plague in 1929–30.** [In parallel French and English.]

This bilingual Report contains much interesting information concerning plague in many countries during the period 1929–30 and previous years. Statistics are given from Africa, Asia, Java, Europe and America. The chart on the cover shows the deaths from plague in Northern India from 1922 to 1930, with a marked reduction during the last four years.

J. H. T. W.

FONQUERNIE (J.). Considérations sur l'épidémiologie de la peste. [**Epidemiology of Plague.**]—*Bull. Soc. Path. Exot.* 1930. Nov. 12. Vol. 23. No. 9. pp. 899–901. [Municipal Bureau of Hygiene, Antananarivo.]

The author believes that man may be a primary or independent carrier of plague as suggested by LEGER [this *Bulletin*, Vol. 24, p. 34]. As the result of numerous observations it is known that very often there is no relation between an epidemic and an epizootic; the former may exist before the second or may occur without any mortality among rodents, before, during or after.

J. H. T. W.

GOLOW (D.) & KNJASEWSKII (A.). Ueber die Rolle der Ektoparasiten eines leeren Nestes des Ziesels (*Citellus pygmaeus*) in der Epidemiologie der Pest. [**Ectoparasites in Empty Suslik Nests and Plague.**]—*Zent. f. Bakt.* I. Abt. Orig. 1930. Oct. 20. Vol. 118. No. 5/6. pp. 277–283. [1 ref.] [State Inst. for Microbiol. & Epidemiol., Saratov.]

In the spring and summer of 1929 there was a severe epizootic of plague among the susliks in the district of Ural and Gurjew, A.S.S.R., reaching to a natural boundary, the river Ural. Fifteen susliks found

dead were infected with plague. Fourteen were shot, and of these two were infected. One of these showed an inguinal bubo and nodules in the spleen and liver. Several nests were examined and the usual flea parasites were found [see this *Bulletin*, Vol. 24, p. 33 (WAGNER & JOFF)].
J. H. T. W.

RUSO (Canio). Recherches expérimentales sur l'épidémiogénèse de la peste bubonique par les insectes. [**Experimental Transmission of Plague by Insects.**]—*Bull. Office Internat. d'Hyg. Publique*. 1930. Nov. Vol. 22. No. 11. pp. 2108-2120. [1 ref.]

The author records the results of experimental infection of certain insects. The larvae of flies fed on the bodies of infected animals suffer no ill effects and complete their biological cycle. Large numbers of plague bacilli are found in their intestines where they multiply. They live on even after the larvae have been removed from the infected food; after five days they are still present but in smaller numbers. The imago emerges but dies quickly, usually in a few hours, from bacteriological infection. On some plague-infected rats *Dermestes lardarius* and *Hister cadaverinus* were found. They did not contain any plague bacilli. Mites living on infected rats may become infected and the bacilli survive for varying periods. The author considers that flies and mites may easily infect cereals, etc., and thus spread the infection of plague [*v. this Bulletin*, Vol. 23, p. 617 (GOSIO)].

J. H. T. W.

KISTER. Die Rattenpestdiagnose in Hamburg. [**Diagnosis of Rat Plague in Hamburg.**]—*Zent. f. Bakt.* I. Abt. Orig. 1930. July 28. Vol. 117. No. 7/8. pp. 433-440. With 6 text figs. [14 refs.]
[State Hyg. Inst., Hamburg.]

The experience of a large port like Hamburg in the prevention of the entrance of plague is especially valuable. In the years 1900 to 1929 there were examined 98,830 rats and mice from 6,466 ships. The bodies of the rats are first searched for fleas: *Xenopsylla cheopis* provided 93.8 per cent. of the species. As regards species of rats, the percentages in the earlier years were *M. rattus* 97.2, *M. decumanus* 2.8, which proportion, however, has altered somewhat and was in 1929: *M. rattus* 69.2, *M. alexandrinus* 18.5 and *M. decumanus* 12.3. The next examination is of general macroscopic appearances which, when positive, are, marked congestion of vessels of the connective tissue, enlargement of glands with surrounding haemorrhages, enlargement of spleen and liver, and sometimes small necrotic areas in these organs and the lungs. Films are made from the organs to show polar-staining short bacilli. Other affections, such as those of Friedländer bacilli, paratyphoid group bacilli, etc., may give similar macroscopic appearances and diagnosis may be very difficult in decomposed animals. In such decomposed material the degeneration forms of plague are of great assistance, with their characteristic ring and disc forms, especially if obtained from the inguinal glands. Bacteria of the haemorrhagic septicaemia group or pseudotuberculosis of rodents were not met with, but would be capable of causing considerable difficulty in diagnosis. Cultures are made from the organs of rats suspected of plague and incubated at 32° C. Endo-agar is often useful when dealing with

decomposed material. Colonies are examined by Gram staining, hanging drop, and by subculture into glucose bouillon for gas production, which, of course, should not occur. Agglutination tests are somewhat difficult owing to the difficulty of procuring good high titre sera. From the organs in which typical polar-staining organisms have been found, inoculations may be made of:—3 rats subcutaneously with organ suspension, 1 rat and 1 guineapig with a piece of an organ in a pocket of skin, and 2 guineapigs cutaneously on the abdomen freed from hair. It requires 5 to 6 days to make a complete examination, especially with decomposed material. A report may be given, even in difficult cases, after 45 hours on the results obtained macroscopically and microscopically in the inoculated animals and this will afford an important saving of time in carrying out necessary disinfection.

W. F. Harvey.

MARTÍNEZ VINUEZA (Juan J.). Peste eruptiva (viruela pestosa) y angina pestosa; formas raras de la peste. [**Eruptive Plague (Plague-Pox) and Anginose Plague.**—*Bol. Oficina Sanitaria Panamericana*. 1930. Oct. Vol. 9. No. 10. pp. 1189-1195.]

Plague has persisted in Guayaquil since its recognition in 1908, though the measures undertaken have greatly reduced its incidence. The majority are typical bubonic cases, but occasionally anomalous symptoms appear and cases illustrative of two of these are recorded. The first is designated variolous plague and is characterized by the appearance of a rash, usually on the sixth day, macular in character, discrete and affecting first the face and arms, soon involving the whole body, and becoming petechial, to the size of a lentil, then papular, and on maturation these papules come to contain yellowish purulent material, drying up in a few days in mild cases and leaving no permanent signs. In severe cases death occurs. Details of two are given; one died on the ninth day, the other passed into a typhoid state on the tenth and died on the twentieth day. Among 727 cases of plague the author has seen 26 such, and of these 24 died [see this *Bulletin*, Vol. 23, p. 181 (KIRK)]. Of the anginose form there are two varieties, though both are due to localization of the organism in the throat. In the one—primary anginose plague—the disease starts with a sore throat from primary localization of the organism there, much local pain, high temperature and shivering, together with the general signs of plague, headache, prostration, etc. The fauces are soon covered with a greyish exudate and there is cervical adenitis. In the other—secondary anginose plague—the condition is less grave and the prognosis more favourable and it is ascribed to a submaxillary bubo "spreading to involve the throat." Details of a primary case are given, death taking place on the fifth day with signs of intense toxæmia and asphyxia. The frequency with which such cases were met with is not stated.

H. H. S.

ASSALI (J.) & POPOFF (S.). Adéno-phlegmon à bacilles pesteux et à évolution chronique. [**Chronic Phlegmonous Adenitis with Plague Bacilli.**—*Bull. Soc. Path. Exot.* 1930. Nov. 12. Vol. 23. No. 9. pp. 997-998. [Native Hosp., Dakar.]

The writer describes a case of chronic bubonic plague in a young, well-nourished native of Senegal. The illness was a month old when the patient was seen. It began with a suppurating bubo in the right groin

which the man opened with a knife. As it got worse the patient came to the dispensary. The right groin contained a tumour as big as the head of a foetus, hard and not very painful. On microscopical examination plague bacilli were found. The bubo was dressed with anti-plague serum and during four days the patient received 320.0 cc. of anti-plague serum. After a month the mass was still foetid and showed several sinuses. On September 26th six large glandular masses were removed from the groin. The temperature fell from 39.2° C. to normal soon after the operation. In one of the glands sent to the Pasteur Institute plague bacilli were found.

J. H. T. W.

COUVY (L.) & POPOFF. Essais de traitement de la peste par le bactériophage. [**Treatment of Plague with Bacteriophage.**—*Bull. Soc. Path. Exot.* 1930. June 11. Vol. 23. No. 6. pp. 618-629. With 11 charts.

During 1929, 145 plague cases were admitted into the hospital for natives at Dakar. June, July and August showed the highest number of cases and of deaths. Eighty-seven of the patients died. There were 126 cases of bubonic plague, 9 of septicaemic plague and 10 of pulmonary plague. The bubonic cases that could be treated during the first 24 or 48 hours of the attack seemed to benefit from injections of anti-plague serum—320 cc. given in four intravenous injections of 80 cc. Among the more serious cases the serum did not appear so active. The bacteriophage was reserved for severe cases and was given by injection either into the bubo, into the subcutaneous tissue or intravenously. 21 severe cases were treated, with 15 recoveries—a better proportion than among milder cases treated with serum. Ten out of the 21 cases are described in detail with charts.

J. H. T. W.

GIRARD (G.). Considération sur le traitement de la peste par le bactériophage (à propos de mémoire de MM. Couvy et Popoff). [**Treatment of Plague by Bacteriophage.**—*Bull. Soc. Path. Exot.* 1930. Nov. 12. Vol. 23. No. 9. pp. 936-942. [2 refs.] [Pasteur Inst., Antananarivo.]

This paper is suggested by the work of MM. COUVY and POPOFF who reported success with bacteriophage treatment of plague [see above]. Returning from France in 1926, the author brought with him a large supply of anti-plague bacteriophage prepared by ELIAVA in the laboratory of M. DUJARDIN-BEAUMETZ, Paris. The strain was that of d'Herelle. Its virulence was such that guineapigs could receive 6.0 cc. without ill effects. At the same time the Director of the Sanitary Service, Madagascar, forwarded to the author several boxes of pestiphage which were received from Alexandria also from d'Herelle source. Both these products were used in Antananarivo from June 1926. After the death of a native doctor and ten others in a village 20 kilometres from Antananarivo, the author and Dr. PIC made an enquiry and learned that the wife of the doctor and a hospital nurse were in danger as contacts. Bloody sputum found by the bedside of the corpse confirmed the diagnosis of primary pulmonic plague. Four days after isolation the wife and nurse showed symptoms of the disease, and the local doctor injected 2.0 cc. of pestiphage into each lung in both cases. The author saw them the following day and gave a bilateral pulmonary injection of 1.5 cc. of bacteriophage

to each patient. After the treatment the temperature in both cases fell— 36.6° and 36.5° —and they seemed better. Four days after these signs of improvement the nurse, Raketam, died with sputum full of plague bacilli. A man servant, Rakotolahy, who had attended the nurse was taken ill the day after her death and received an injection of 1.0 cc. of pestiphage in each lung on the 14th June. As his condition was grave on the 17th 4.0 cc. of bacteriophage were injected into the right lung, which seemed the most affected. This man recovered. Later another opportunity came for trial of this treatment. In the district of Soavinandriana between June 25th and July 5th Dr. GUILLIN treated nine cases of pulmonary plague under the best conditions. They all died. At Antsirabe Dr. MONNIER injected 2.0 cc. intravenously into an infirmiry attendant who died without improvement. A few other cases were treated without benefit. On examination the pestiphage and the bacteriophage were found to have lost their lytic power *in vitro*; the virulence had disappeared and D'HERELLE has stated that only bacteriophage of maximum virulence is of any value. After 3 months the bacteriophages were useless. They should evidently only be used when quite fresh from the laboratory [see this *Bulletin*, Vol. 27, p. 737 (FLU; DOORENBOS)]. J. H. T. W.

KURAUCHI (K.). **Differentiation of *B. pestis* from Allied Organisms by Means of their Biological Properties. Isolation of a Strain of Plague-like Bacillus from a Suslik.** *Plague Studies* 3.—*Jl. Oriental Med.* 1930. June. Vol. 12. No. 6. [In Japanese. English summary pp. 49–52.]

— **Differentiation of *B. pestis* from Allied Organisms by Means of their Biological Properties. On a Plague Bacillus-like Strain isolated from a Suslik.** *Plague Studies* III.—*Kitasato Arch. Experim. Med.* 1931. Jan. Vol. 8. No. 1. pp. 45–59. [35 refs.] [Hyg. Inst., S. Manchurian Rly. Co., Dairen.]

A plague-like bacillus was isolated from a suslik which showed typical post-mortem appearances of acute plague. It differed from typical plague bacilli only by being non-pathogenic and by its want of formation of viscid colonies on agar. The isolation of this organism was made the occasion for making comparative studies on a number of other strains of organisms which comprised 29 of *Past. pestis*, 13 of the haemorrhagic septicaemia group and one of *Past. pseudotuberculosis rodentium*. As a result of these studies it was concluded that the strain of plague-like organism isolated was a true plague bacillus. W. F. Harvey.

NISHIMURA (H.). **The Susceptibility to Plague Infection of Susliks found in Inner Mongolia (*Citellus mongolicus ramosus* Thomas).** *Plague Studies* 5.—*Jl. Oriental Med.* 1930. July. Vol. 13. No. 1. [In Japanese. English summary p. 7.] [Hyg. Inst., S. Manchurian Rly. Co., Dairen.]

This investigation was begun with the hope of determining the susceptibility to *Past. pestis* of all the small mammals found in Inner Mongolia, but this was found to be impracticable owing to difficulty of procuring them and because many of the animals died in captivity. Only susliks could be transported in perfect health to Dairen. These animals were found to be very susceptible to plague infection either from infected corpses of susliks or by inoculation of plague bacilli.

J. H. T. W.

GOMILA (Frank R.). **A Characteristic Exanthem in Epizootic Plague and the Experimental Reproduction of this Lesion in the Guinea Pig.**—*Proc. Soc. Experim. Biol. & Med.* 1930. June. Vol. 27. No. 9. pp. 918-919. [Municipal Health Dept., New Orleans.]

An epizootic of plague among rats gave the opportunity for study of approximately 150,000 of these animals. A discoloration of the feet was noticed in plague rats which varied from a pink to salmon colour. It was clear cut and had a distinct line of demarcation. The extent of this discoloration varied from mere "pink feet" in slight affections to one which might cover the extremities and even appear upon the abdomen and thorax. It suggested somewhat discoloration such as is seen in carbon monoxide poisoning. Only 25 per cent. of infected rats failed to show "pink feet" and there was evidence to show that these were animals which had only been recently infected. A definite test was made in guineapigs of the significance of this sign. Two hundred and fifty guineapigs were variously inoculated with material from plague rats all of which developed plague and 95 per cent. of which demonstrated the characteristic exanthem. This exanthem, then, may be described as typical in rodent plague.

W. F. Harvey.

SATHE (R. G.). **Notes on the Pathological Lesions observed in Domestic Animals experimentally infected with Plague.**—*Indian Vet. Jl.* 1930. Oct. Vol. 7. No. 2. pp. 142-147.

Experimental infection in sheep, calves and bullocks with virulent cultures of plague injected intravenously produces lesions very similar to those in cattle and sheep suffering from haemorrhagic septicaemia. From the pathological lesions and the presence of bipolar organisms in the animals the identity of the causal organisms cannot be established. No diagnosis of plague can be made in an animal unless serological and immunological tests are carried out.

J. H. T. W.

AKULOWA (R. F.) & RUDNEW (G. P.). **Das Blutbild bei experimentell erzeugter Pest. [The Blood in Experimental Plague.]**—*Zent. f. Bakt. I. Abt. Orig.* 1930. Dec. 8. Vol. 119. No. 1/2. pp. 39-48. With 13 text figs. [10 refs.]

While working during an epidemic of plague in Sawjetnoje, North Caucasus, in 1929, the authors became interested in the blood changes in plague-stricken marmots (*Citellus pygmaeus*). Later experiments were made in the laboratory on 26 marmots infected experimentally with plague, 4 being used as controls. These infected animals died in about eight days. The blood of the infected animals showed a sharp rise in the number of leucocytes up to 20,000, or nearly three times the number estimated for a healthy marmot (7,000 to 9,000). Neutrophils decreased and lymphocytes increased and the former often showed signs of degenerative granulation. The text contains photographs showing the condition of the blood and phagocytosis.

J. H. T. W.

COMPTON (Arthur). Etudes sur l'immunité dans la peste expérimentale. [**Studies on Immunity in Experimental Plague.**]—*Ann. Inst. Pasteur*. 1930. Dec. Vol. 45. No. 6. pp. 754-767. With 3 charts in text. [8 refs.]

Experiments on rats have led the author to the conclusion that a specific serum appears to be at the present time the most efficacious mode of treatment of plague, whereas a specific bacteriophage subcutaneously injected is without value. On the other hand, administration of bacteriophage subcutaneously before the infection, that is to say, as a prophylactic, is of definite value. Two injections are better than one and three are still better. A formalized bacteriophage also gives good prophylactic results. Sensitization of the animals has been noticed as a result of bacteriophage immunization, but this disappears if the injections are repeated. No bacteriophage corpuscles could be found after injection in the blood or the stools and this is probably due to their suppression by the tissues of the animal during the course of immunization. Bacteriophage immunity is, then, not protobiotic: it is essentially antibacterial and antitoxic.

W. F. Harvey.

COUVY (L.) Note sur un principe lytique pour le bacille de Yersin, isolé de selles de convalescents de peste. [**Note on a Lytic Principle for the Plague Bacillus from Stools of Convalescents.**]—*Bull. Soc. Path. Exot.* 1930. Nov. 12. Vol. 23. No. 9. pp. 943-950. [1 ref.]

A portion of stool is mixed with 20 times its volume of ordinary bouillon and brought to pH 7-8. This mixture is kept for 24 hours at 37° C., filtered through paper sprinkled with infusorial earth and then through an L3 or L5 Chamberland candle. After a second incubation for 48 hours the filtrate is again filtered. With this filtrate tests for lysis have been carried out and also trial of therapeutic efficacy. The lytic power of the filtrate was established by test on suspensions of *Past. pestis* in normal salt solution and in peptone water and an exaltation of its virulence was found to take place as a result of repeated addition of young cultures. Therapeutically some striking results were obtained in severe cases of plague and cures are claimed from the use of this lytic principle. The best results were obtained with a very active filtrate, which had been subjected to a minimum of passages *in vitro*. It was found that even although strains had with many passages attained great virulence, their activity *in vivo* was not of a high degree.

W. F. Harvey.

BURGESS (A. S.). **Virulence, Immunity and Bacteriological Variation in Relation to Plague.**—*Jl. Hygiene*. 1930. June. Vol. 30. No. 2. pp. 165-179. With 9 figs. on 2 plates. [8 refs.] [Med. Research Inst., Accra.]

The medium preferred for culture was one in which the whole of the meat was included instead of merely an extract. This was neutralized to phenol phthalein and 40 per cent. excess of alkali added. It gave heavier cultures. African pouched rats (*Cricetomys gambianus*)

were found to be very suitable test animals, as they are large, stand captivity well and are extremely susceptible. An experiment designed to test the relative immunizing values of different types of vaccine showed that a broth-grown culture was superior to an agar-grown culture and that carbolized spleen pulp from an infected rat, containing a true "body strain," was more effective than either. This last type of vaccine is complicated and has little practical value.

Several experiments are described which demonstrated loss or reduction of virulence of *Past. pestis* by passage through immune or partially immune rats. Such a culture, of reduced virulence, could have its virulence restored by successive passages through normal rats, but it was noteworthy that the number of passages required was greater than for bacilli which had been attenuated by long cultivation. Three types of plague colony were met with and these were connected by intermediate types. They were (a) the small fringed type which is the typical form, (b) the simple round type without fringe, and (c) the large, irregular type. In the case of old avirulent strains it was found that the bacilli tended to become longer and might cohere in filaments of considerable length. The cultures used in this work, unlike those used in earlier experiments, lost their virulence in a few months when kept at room temperature, an effect which may really have been due to a higher temperature of preservation.

W. F. Harvey.

LA ROSA (Gaetano). L'azione della bile sul bacillo della peste. [**The Action of Bile on *Past. pestis*.**]—*Giorn. di Batteriol. e Immunol.* 1930. Dec. Vol. 5. No. 12. pp. 1768–1780. [2 pages of refs.] [Inst. of Hyg. & Bact., Univ., Catania.]

The object of this research was to determine the effect of bile on the culture, morphology and virulence of the plague bacillus. It was found that the organism grew luxuriantly in pure bile whether fresh or sterilized and in bile broth of varying strength. In the fresh bile and in the stronger concentrations of bile broth the plague bacillus undergoes very special change in its morphology and a great diminution in virulence. This diminution, however, is of temporary character and the virulence is quickly restored by animal passage. It is the same with the morphological changes, for the original form is rapidly recovered by subculture in ordinary broth media.

W. F. Harvey.

TINKER (I. S.) & RUDNEW (G. P.). Zum Studium ueber die Lebensfähigkeit des *Bac. pestis*. [**Vitality of *Past. pestis*.**]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1930. Oct. Vol. 34. No. 10. pp. 554–559.

The vitality of *Past. pestis* was studied chiefly from the point of view of its resistance to reagents used in blood examination. Giemsa solution of strength 1 or 2 drops per cc. had no lethal effect on unfixed preparations. Hayem's fluid and Turk's fluid were also tested. Hydrochloric acid, commonly used in hæmoglobin estimation, was without effect in strength 0.05 per cent. but killed off plague bacilli in 45 minutes at 0.5 per cent. A thick drop of blood, containing bacilli, dried and stained with Giemsa, showed living organisms even 2 hours after removal.

W. F. Harvey.

MITCHELL (J. A.) with Appendices by PIRIE (J. H. Harvey), RHODES (W. F.) & POWELL (W.). **Epizootic among Veld Rodents in De Aar and Neighbouring Districts of the Northern Cape Province.**—*Jl. Hygiene*. 1930. Feb. Vol. 29. No. 4. pp. 394–414.

A previous account of this epizootic which appeared in another journal has been already noticed [this *Bulletin*, Vol. 27, p. 740]. The present paper and especially the appendices contain more detailed information as to the nature of the disease and the causative agent. During the summer months of 1928–29 an epizootic occurred in De Aar and neighbouring districts, mainly affecting Namaqua gerbilles (*Desmodillus auricularis*). Many of the animals showed a haemorrhagic septicaemia, the causative organism of which appeared to be a *Pasteurella* smaller than *Past. pestis*. A description of this organism is given and the name *Past. desmodilli* is suggested. It is highly pathogenic for rabbits, less so for guineapigs, and non-pathogenic for rats and fowls. It was found by Rhodes to be highly pathogenic for *Lobengula gerbilles* (*Tatera lobengula*) from Cape Town, but less virulent for those from Johannesburg. Dr. Rhodes gives an account of the pathology. Dr. Powell gives an interesting summary of the differences between this disease and ordinary plague in veld rodents. In the latter the animals rarely show signs of illness before death and there is no alarm or disturbance of the rodent colonies. In the De Aar epizootic the animals appeared to suffer from pains in the stomach, with fever, restlessness and periods of drowsiness—death taking place after some hours of illness. The rodent colonies are disturbed and alarmed. The healthy rodents run about excitedly and the sick animals wander away aimlessly and may travel some distance before dying. The mortality is very rapid and the infection remains active for a few weeks only. In typical plague the mortality is, as a rule, not very rapid and the infection usually remains active for from six to twelve months.

J. H. T. W.

IWANOWSKY (N.) & SASSYKINA (T.). Die Schardinger-Reaktion bei der Differentialdiagnose des *B. pestis* und *B. pseudotuberculosis rod.* Pfeifferi. [**Reduction of Methylene Blue as a Differential Test between *Past. pestis* and *Past. pseudotuberculosis rodentium*.**]—*Rev. Microbiol., Epidemiol. et Parasit.* 1930. Vol. 9. No. 1. pp. 72–76. [16 refs.] [In Russian. German summary pp. 132–133.] [Inst. of Microbiol. & Epidemiol., Saratov.]

— & —. Die Anwendung der Schardinger-Reaktion zur Differentialdiagnose von *Bacillus pestis* und *Bacillus pseudotuberculosis rod.* Pfeifferi.—*Zent. f. Bakt. I. Abt. Orig.* 1930. July 28. Vol. 117. No. 7/8. pp. 535–539. [16 refs.] [State Inst. of Microbiol. & Epidemiol., Saratov.]

The points investigated were the influence of the concentration of the reagent and the temperature on the velocity of the reactions, the influence of light and the age of the culture. Reduction starts at the bottom of the test tube and extends upwards. Test tubes in series are filled with 3 cc. of a suspension of a 2-day culture in normal salt solution. The reagent had the composition:—Saturated alcoholic methylene blue, 5; formaldehyde, 5; water, 200. Different quantities of the reagent were added to the test tubes, mixed with the bacterial suspension, made up to 4 cc. and covered with a 2 cm.-high layer of paraffin. Each series was kept at 19°, 30°, 45° and 60° C. Reduction power is much more pronounced in the case of *Past. pseudotuberculosis rodentium* than of *Past. pestis*.

Only 3 strains of plague out of 60 decolorized the dye completely and that in 2 to 3 hours at 30° C., whereas decolorization was complete in all 11 strains of *Past. pseudotuberculosis rodentium* in under one hour.

W. F. Harvey.

BERLIN (A.). Zur Frage ueber die Bedeutung der Thermo-Präzipitationsreaktion in der Praxis der Untersuchung der Pestepizootien. [**Specificity of the Thermoprecipitin Reaction in Plague.**]—*Rev. Microbiol., Epidémiol. et Parasit.* 1930. Vol. 9. No. 1. pp. 54–59. [11 refs.] [In Russian. German summary p. 129.] [Inst. of Microbiol. & Epidemiol., Saratov.]

The serum used was a curative plague serum. It was found that the reaction, carried out with extracts of organs, was positive in the case of 83.3 per cent. of naturally infected animals but also positive in 12.2 per cent. of non-plague animals. This is not sufficiently specific to be of practical use.

W. F. Harvey.

BERLIN (A.). Serodiagnose der Pest und Konglutinationsreaktion mit den Pestbacillen. [**Serum Conglutination Reaction with Plague Bacilli.**]—*Rev. Microbiol., Epidémiol. et Parasit.* 1930. Vol. 9. No. 1. pp. 10–53. With 1 chart in text. [75 refs.] [In Russian. German summary pp. 127–128.] [Inst. of Microbiol. & Epidemiol., Saratov.]

The reaction, if it is to attain precision and exclude fallacy, requires titration of the complement which is used in the test. It is more sensitive than the agglutination reaction but is no more able than other serum reactions to differentiate between *Past. pestis* and *Past. pseudotuberculosis rodentium*.

W. F. Harvey.

BULLETIN DE L'OFFICE INTERNATIONALE D'HYGIÈNE PUBLIQUE. 1930. May. Vol. 22. No. 5. pp. 940–977. Rapport du Dr. G. D. Chitre, résumant les observations faites dans les docks de la Société du Port de Bombay par le fonctionnaire chargé des recherches sur la prophylaxie de la peste, sous la direction du Directeur du Laboratoire de Bactériologie de Bombay à Parel, Bombay. [**Plague Prophylaxis in the Port of Bombay.**]

The compiler of this Report gives a detailed account of the methods employed for preventing and eradicating plague in the Bombay Docks. The paper will be useful to young men beginning sanitary work.

J. H. T. W.

BOUFFARD (G.). Au sujet de l'étiologie de la peste. [**Etiology of Plague.**]—*Bull. Soc. Path. Exot.* 1930. June 11. Vol. 23. No. 6. pp. 563–564.

As the result of experience in plague on the Madagascar plateau at Antananarivo the author states that man transports plague infection for long distances, creating a local interhuman epidemic during the course of which the rats may become infected, thus leading to an endemic condition of long duration.

J. H. T. W.

LEGER (Marcel). Rôle non exclusif des rats comme réservoirs du virus de la peste. [**The Rat not the Sole Reservoir of Plague.**—*Bull. Soc. Path. Exot.* 1930. June 11. Vol. 23. No. 6. pp. 564-568. [7 refs.]

Without denying the important rôle of rats, etc., in the transmission of plague, the author considers the rôle of man, as convalescent carrier, chronic carrier and healthy carrier, cannot be disregarded [this *Bulletin*, Vol. 24, p. 34 (LEGER)]. The author quotes Inspector General LASNET, who has expressed a similar opinion with regard to plague in Madagascar.

J. H. T. W.

TIKHOMIROVA (M.) & NIKANOROV (S.). **Ticks as Plague Carriers.**—*Rev. Microbiol., Epidémiol. et Parasit.* 1930. Vol. 9. No. 1. pp. 60-61. [1 ref.] [In Russian. English summary pp. 129-130.] [Inst. of Microbiol. & Epidemiol., Saratov.]

Definite cultural and infectional evidence of the presence of plague bacilli in the alimentary tract of ticks, which were found on plague-infected susliks and tarbagans, has been obtained. This may prove to be of epidemiological importance.

W. F. Harvey.

GOLOV (D.) & KNIAZEVSKY (A.). Sur le rôle des ectoparasites (puces et tiques) du nid vide des spermophiles (*Citellus pymaeus*) dans l'épidémiologie de la peste. [**The Role of Fleas and Ticks of the Empty Nest of Spermophiles in the Epidemiology of Plague.**—*Rev. Microbiol., Epidémiol. et Parasit.* 1930. Vol. 9. No. 1. pp. 62-67. [In Russian. French summary pp. 130-132.] [Inst. of Microbiol. & Epidemiol., Saratov.]

During an intense epizootic of plague in Kirghiz it was found that fleas and ticks from the empty nests of spermophiles could be plague-infected. Plague-infected fleas were also found in this epizootic upon healthy spermophiles.

W. F. Harvey.

RANDRIA (Stanislas). Localisation rare d'un bubon pesteux, bubon sus-épitrochléen. [**Rare Position of Plague Bubo.**—*Bull. Soc. Path. Exot.* 1930. May 14. Vol. 23. No. 5. pp. 553-554.

Records a case of plague in which the only bubo was above the elbow in the epitrochlear gland.

J. H. T. W.

GAISKY (N.). Les problèmes d'épidémiologie [de la peste] et d'épizootologie en rapport aux particularités de la nature de la région des Kirghiz. [**Epidemiology of Plague in the Kirghiz Region.**—*Rev. Microbiol., Epidémiol. et Parasit.* 1930. Vol. 9. No. 1. pp. 1-9. With 2 text figs. [Refs. in footnotes.] [In Russian. French summary pp. 125-126.] [Inst. of Microbiol. & Epidemiol., Saratov.]

This paper deals with the influence of local conditions and the bionomics of the marmot upon the epidemiology of plague (mention of which is omitted in the title of the French résumé). The treatment of the subject is rather speculative.

C. A. Hoare.

PHOTAKIS (B. A.). Pathologisch-anatomische Befunde bei einem Pestfall. [**Pathological Anatomy of a Case of Plague.**]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1930. Oct. Vol. 34. No. 10. pp. 562-564. [1 ref.]

The author describes at some length the morbid anatomy and morbid histology of a case of plague, but the paper contains nothing new, nothing that has not been recorded by other writers.

J. H. T. W.

HALLER (O.). Die experimentelle Pest der Katzen. [**Experimental Plague in Cats.**]—*Rev. Microbiol., Epidémiol. et Parasit.* 1930. Vol. 9. No. 2. pp. 139-154. [In Russian. German summary pp. 277-280.]

A laboratory paper of experiments on cats—of no particular interest. [It is well known that cats contract plague under natural conditions.]

J. H. T. W.

SABOLOTNOW (P.) & SCHMIDT (B.). Zur Morphologie der experimentellen Lungenpest. [**Morphology of Experimental Lung Plague.**]—*Rev. Microbiol., Epidémiol. et Parasit.* 1930. Vol. 9. No. 2. pp. 155-168. [9 refs.] [In Russian. German summary p. 280.] [State Inst. for Microbiol. & Epidemiol., Saratov.]

The author describes the morbid anatomy of experimental pneumonic plague as seen by him; his work more or less agrees with previous findings [see this *Bulletin*, Vol. 22, p. 375 (KULESHA)].

J. H. T. W.

BEZSONOVA (A.) & LOKHOV (M.). **A Case of Pigment Production by Plague Bacilli.**—*Rev. Microbiol., Epidémiol. et Parasit.* 1930. Vol. 9. No. 1. pp. 109-112. With 1 text fig. [6 refs.] [In Russian. English summary p. 137.] [Inst. of Microbiol. & Epidemiol., Saratov.]

A slope-agar culture of plague, isolated from a suslik and kept at room temperature for 2 months, developed in the centre of several of the colonies a dark violet pigment. Subcultures from the pigmented portion produced typical colonies of *Past. pestis*.

W. F. Harvey.

- i. KENAOUI Bey (N.). Epidémiologie de la peste à Alexandrie. [**Plague in Alexandria.**]—*Rev. Prat. Malad. des Pays Chauds.* 1930. June. Vol. 10. No. 6. pp. 251-257.
- ii. OMAR Bey (Abdel Rahman). Etude clinique de la peste.—*Ibid.* pp. 258, 261-264.
- iii. COMPTON (Arthur). Rapport sur la peste (Bactériologie).—*Ibid.* pp. 265-268.

These papers deal with plague in the past and in the present time in Alexandria: i. Epidemiology; ii. Clinical aspects of plague; and iii. Bacteriology; they contain nothing new.

J. H. T. W.

ARISTARKHOVA (O.). Observations sur la peste endémique en Russie.—*Bull. Soc. Path. Exot.* 1930. Nov. 12. Vol. 23. No. 9. pp. 901-904. [3 refs.]

BOUFFARD (G.). Considérations au sujet de la transmission de la peste.—*Bull. Soc. Path. Exot.* 1930. May 14. Vol. 23. No. 5. pp. 455-456.

- CONSEIL (E.) & DURAND (P.). La peste pulmonaire de Tunis en 1929-30.—*Tunisie Méd.* 1930. Apr. Vol. 24. No. 4. pp. 129-135.
- LEGER (Marcel). Remarques sur l'interdépendance de la peste chez le rat et chez l'homme.—*Bull. Soc. Path. Exot.* 1930. May 14. Vol. 23. No. 5. pp. 448-451.
- MANDOUL (H.). Les rats et la peste.—*Jl. Méd. de Bordeaux.* 1930. June 30. Vol. 107. No. 18. pp. 499-501.
- SSYSSINE (A.). Petite épidémie de peste au Kazakstan oriental de l'U.R.S.S.—*Bull. Office Internat. d'Hyg. Publique.* 1930. Nov. Vol. 22. No. 11. pp. 2101-2102.
- THIROUX. Recherches sur les causes de l'existence de la peste pulmonaire dans les régions froides ou tempérées et de son absence dans les zones à température élevée à Madagascar.—*Ann. de Méd. et de Pharm. Colon.* 1930. Jan.-Feb.-Mar. Vol. 28. No. 1. pp. 35-43.

TROPICAL DERMATOLOGY.

Fox (Howard). **Dermatology in Mexico.**—*Arch. Dermat. & Syph.* 1930. Oct. Vol. 22. No. 4. pp. 620–623. [1 ref.]

Although there are five other hospitals throughout the country, the scientific study of dermatology is chiefly confined to Mexico City. At the General Hospital there are 30 skin beds, where cases of pellagra and pseudopellagra in alcoholics were seen. As the modern treatment of ringworm by thallium acetate is the result of work done in Mexico in 1919, it is interesting to note that more than 1,500 cases have been treated there without any serious ill-effects. From his own local studies the author is of the opinion that pinta and carate are clinically identical. For the treatment of leprosy there are special dispensaries, but no hospitals or colonies. The official report of 1927 gives the number of lepers as 1,450, but it is probable that the actual figure is somewhere in the neighbourhood of 7,000. The republic also contains fifty dispensaries for the treatment of syphilis, but the only figures available in this connexion refer to injections, tests, etc.

M. Sydney Thomson.

BONNIN (Henri). Les dyschromies tropicales. [**Tropical Anomalies of Pigmentation.**]—*Rev. Prat. Malad. des Pays Chauds.* 1930. Aug. Year 9. Vol. 10. No. 8. pp. 367–370, 373–380, 383–385. [2 refs.]

A very complete discussion of all dyschromias, starting with congenital changes such as albinism, passing through general diseases (pellagra, etc.), physiological and toxic changes, to a full description of scarring effects and mycotic infections. The article contains many synonyms for each disease, including the native terms from many parts of the world. Carate and *Tinea versicolor flava* are dealt with very fully. "Among coloured races dyschromias are more often due to variations in the thickness, etc., of the horny layer (caused by fungi) than to variations in the distribution of the cutaneous pigment itself."

M. S. T.

KUROTCHKIN (T. J.) & CHEN (F. K.). **A Study on the Etiology of Hongkong Foot.**—*Nat. Med. J. China.* 1930. Oct. Vol. 16. No. 5. pp. 556–562. [7 refs.] [Peiping Union Med. College, Peiping.]

Mycological investigations designed to determine precise details of the causative fungi and the possible existence of "carriers." Of 150 apparently normal individuals only 5 revealed fungus between the toes, but 107 grew *Penicillium* and *Aspergillus*. Twenty-five per cent. of doubtful clinical cases gave positive results. Nearly all the typical cases were confirmed microscopically. Cultures proved *Trichophyton pedis* α and β to be dominant, these two fungi differing from each other, however, only in the colours of their colonies.

M. S. T.

WEISS (Pedro). Sur un trichophyton isolé de trois cas de dyshidrose des extrémités. [**A Trichophyton isolated from Three Cases of Dyshidrosis.**]—*Rev. Sud-Américaine de Méd. et de Chirurg.* Paris. 1930. Mar. Vol. 1. No. 3. pp. 277-282. With 4 text figs. [Research Lab., Faculty of Med., Lima.]

It is stated that 50 per cent. of the middle-class adults in Lima suffer from dyshidrosis of the hands and feet during the spring. Microscopical investigations revealed the presence of fungi in the great majority of cases, but only 3 pure cultures were obtained. These were all identical and are classified as belonging to the Aleuroclosters, full details and diagrams being given. The one clinical picture (of the sole) would seem to be typical of ringworm and in no way resembles dyshidrosis as understood in Britain.

M. S. T.

CARRION (Arturo L.). **Observations on Dermatomycosis in Porto Rico. Report on Epidermophytosis of the General Surface of the Skin.**—*Porto Rico Jl. of Public Health & Trop. Med.* 1930. Dec. Vol. 6. No. 2. pp. 217-220. With 12 plates. [School of Trop. Med., Univ., Porto Rico.]

The disease is extremely common in Porto Rico, and is by no means restricted to the inguino-crural region. Often the area of a single sheet of infection may involve a square foot or more. Lesions of the face and neck often extend for several inches into the scalp, yet the hairs in such lesions have never been found to be invaded. The differential diagnosis is discussed in detail. The illustrations are good.

M. S. T.

IN (Keiden). **A Study of Dermatophytes along the Shores of the Lower Course of the Yang-Tse-Kiang (II).**—*Japan. Jl. Dermat. & Urol.* 1930. July. Vol. 30. No. 7. pp. 81-83. [Section on Dermat. & Syph., Imperial Univ., Tokyo.]

Discusses a disease known locally as La-Li-Dau. It is probable that this is always secondary to favus (*A. Schoenleinii*) of the scalp and is itself really favus of the glabrous skin. In some cases chronic abscesses appear, difficult to differentiate from kerion and from which the fungus has been cultivated. It is suggested that the name *Favus profunda* be applied to such cases.

M. S. T.

TAYLOR (K. P. A.). **Treatment of Ringworm Infection of the Feet with the Ethyl Chloride Spray.**—*Southern Med. Jl.* 1930. Dec. Vol. 23. No. 12. pp. 1128-1130. [7 refs.]

A detailed report of twenty cases in which no other treatment was used except where severe pyogenic infection necessitated wet dressings with a 4 per cent. boric acid lotion. Only eight temporary relapses occurred, but the longest period of observation after apparent cure was only two months. The affected patch is exposed to the ethyl chloride spray until blanched, the spray then being continued for a further 30 to 60 seconds. The blanching should extend about 0.5 cm

beyond the obvious lesion. This is repeated in daily doses of 30 seconds (twice a day for the sole). At the most 6 exposures only are necessary, but the method is contra-indicated where eczematization is present. Itching is usually relieved at once and extensive desquamation always occurs.

M. S. T.

URUEÑA (J. Gonzalez). **Ringworm of the Soles in Mexico. Clinical Study.**—*Arch. Dermat. & Syph.* 1930. June. Vol. 21. No. 6. pp. 909-915. With 4 text figs.

"The vesiculated type of ringworm, resembling dyshidrosis, is rare," most cases showing maceration, scaling, fissuring, secondary infection and eczematization only in the typical areas of distribution. The paper concludes with a study of *Trichophyton asteroides*. It is not stated, however, how frequently this organism is found.

M. S. T.

SMITH (E. C.). **Two Cases of Dermatitis due to a Species of *Hormodendrum*.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1931. Jan. 31. Vol. 24. No. 4. pp. 461-464. With 3 plates. [Med. Research Inst., Lagos, Nigeria.]

A description of two atypical "ringworm" cases, the only two such cases seen in Lagos during several years. The first patient showed numerous dry, slightly raised, irregular and scaly patches. On scraping, the epithelium broke away to leave a raw base. In the second case a definite advancing edge was present, but it too was psoriasiform and friable. Nails were apparently uninfected although there was thickening of the nail-bed. The fungus was easily found both in scrapings and sections, whilst cultures gave green colonies of *Hormodendron*, the exact species being at present undetermined.

M. S. T.

FRAGA (Arminio). [In Portuguese & English.] **Sobre um caso de dermatite ulcero-nodular causada pelo *Hormodendrum Langeroni*. On a Case of Ulcero-Nodular Dermatitis produced by *Hormodendrum Langeroni*.**—*Rev. Med.-Cirurg. do Brasil.* 1930. Sept. Vol. 38. No. 9. In Portuguese pp. 321-329. With 12 text figs. & 2 figs. on 1 plate. In English pp. 330-336.

A detailed account of a case occurring in a negress aged 39. The lesions appeared on the right leg, which was also affected by longstanding varix. There was present a single ulcer measuring 3 cm. in its longest diameter and having a sharply cut and partially undermined edge. The base was irregular, dark red and covered with a malodorous and purulent exudate. There were also present three subcutaneous nodules arranged in a straight line, with intervals, at some distance proximal to the ulcer. The inguinal glands of the same side were also enlarged. Material was taken from an unbroken nodule and from it the characteristic cultures were obtained. Rapid healing occurred after intravenous injections of sodium iodide. The article also discusses cases previously described and details the microscopical and cultural features of the organism.

M. S. T.

KUROTCHKIN (T. J.) & CHUNG (H. L.). **Mycological Examination of Peiping Orphanages.**—*Nat. Med. Jl. China.* 1930. Apr.–June. Vol. 16. No. 2/3. pp. 171–176. With 5 figs. on 2 plates (1 coloured). [1 ref.] [Peiping Union Med. College, Peking.]

Examination of 5 orphanages, containing a total of 1,155 children, showed that ringworm was present in all the institutions, and was very prevalent in four of them, the infection in one affecting 90 per cent. of the children. The most common fungus was *Trichophyton violaceum*, two varieties of which were isolated. The fungus second in order of frequency is provisionally named *Trichophyton* "A." *Trichophyton glabrum*, *Microsporum ferrugineum* (two varieties) and *Achorion schönleinii* were also met with.

P. Tate.

DA FONSECA (Olympio), Jr. & LEVY (A. Simão). [In Portuguese & English]. Uma epidemia de tonsurante infantil no Rio de Janeiro. **Epidemic Outbreak of Scalp Ringworm in Rio de Janeiro.**—*Rev. Med.-Cirurg. do Brasil.* 1930. Apr. Vol. 38. No. 4. In Portuguese pp. 136–139. With 4 figs. In English pp. 140–141. [Oswaldo Cruz Inst. & Med. School, Rio de Janeiro.]

Scalp ringworm is uncommon in Brazil, but an epidemic broke out in a children's boarding school near Rio de Janeiro in 1929. Of 150 children about one-third were infected, 3 being girls and the remainder boys. Cultures showed that *Trichophyton violaceum* was the fungus infecting the boys, and *Trichophyton acuminatum* that infecting the girls.

P. Tate.

CATANEI (A.). Etude des teignes dans la Grande Kabylie. [**Ringworm in the Grand Kabylie.**]—*Bull. Soc. Path. Exot.* 1930. Feb. 12. Vol. 23. No. 2. pp. 170–173. [1 ref.] [Pasteur Inst. of Algeria, Algiers.]

An examination carried out along lines similar to those adopted by the author in his recent investigations of ringworm in neighbouring parts of North Africa. Of 663 children examined, 89 were infected with trichophyta and 32 with favus, there being no cases in which *Microspora* were found. The majority of patients were between 6 and 13 years of age, boys being more numerous than girls. Cultures proved the presence of three varieties of fungus only. *Tr. glabrum*, *Tr. violaceum* and *A. schoenleinii*.

M. S. T.

CATANEI (A.). Etude des teignes dans des agglomérations européennes d'Algérie. [**Ringworm among the European Population of Algeria.**]—*Bull. Soc. Path. Exot.* 1930. Apr. 9. Vol. 23. No. 4. pp. 363–368. [1 ref.] [Pasteur Inst. of Algeria, Algiers.]

Investigations carried out in Oran and Algiers among inhabitants of Spanish and Italian extraction. Among 285 children examined, 19 out of a total of 22 infected were found in a fishing village west of Algiers, the population being preponderantly Italian. Of the 22 cases, the

majority occurred between the ages of 6 and 10 years, and were girls, an unexpected discovery. Two of the patients only suffered from favus, *A. schoenleinii* being responsible. The remaining 20 gave cultures of *Tr. glabrum* and *Tr. violaceum*. *Tr. sulfureum* was also isolated once. No cases of Microsporon infection were discovered.

M. S. T.

McGUSTY (V. W. T.). **Tinea Imbricata in Fiji—with Suggestions for its Treatment and Prevention.**—*Fiji Ann. Med. & San. Rep. for Year 1929.* pp. 67–71.

The disease is widespread in Fiji, particularly among the inland natives. It is pointed out that the mucous membranes may be involved, but the hairs are always unaffected and are only lost where lichenification has supervened in very chronic cases. The whole body, including nostrils, external auditory meatus, etc., is painted every five days in limited areas with a 40 per cent. solution of salicylic acid in tinct. iod. fort. Three applications usually produce a cure, but the method must be modified in children and in certain areas such as the eyelids. The paper discusses the questions of segregation and disinfection of huts, etc., very thoroughly.

M. S. T.

DA FONSECA (O.). **Parasitological and Clinical Relationship between Asiatic and Oceanian Tokelau and Brazilian Chimbêrê of some Matto-Grosso Indians.**—*Rev. Med.-Cirurg. do Brasil.* 1930. Aug. Vol. 38. No. 8. pp. 292–307. With 6 figs. on 4 plates. [6 pages of refs.]

In the cases described the characteristic features are large, circinate and confluent patches of scaling on the exposed parts of the body. They are always unpigmented and the scaling is more intense at the centre. No lesions of the hair or nails were observed. Microscopy of the scales shows small reddish brown granules in the cells of the mycelium, whilst the cultural characteristics of the fungus classify it as an Endodermophyton. It is stated that concentric rings were never seen but that on all other grounds these cases seem closely related to those of Tokelau ringworm. The article also contains a very full account of the topography, etc., of this and such closely related diseases as Tokelau and Pinta.

M. S. T.

RAMOS Y SILVA (J.). **Sobre um novo caso de "Tinea nigra."** [**A Fresh Case of Tinea nigra.**]—*Brasil-Medico.* 1930. July 12. Vol. 44. No. 28. pp. 755–757. With 3 text figs. [4 refs.]

Infection by *Cladosporium wernecki*, so named by HORTA and LANGERON as differing from *Cl. mansonii*, is rare in Brazil. The first case was recorded by HORTA in 1921; a second by SILVA in 1929, while RIETMANN in 1930 stated that he had been able to collect notes of eight in Salvador (Bahia). All were in males and, according to RIETMANN, all in the palm of the hand. The patient referred to in this paper was a laboratory assistant who, a few days after contact with a

typical case, developed a lesion on the neck. The fungus was isolated and cultivated on maltose sugar. Growth is slow; the colony was 15-20 mm. in diameter and 5 mm. high at the end of a month.

H. H. S.

DA FONSECA (Olympio), Jr. & DA ROSA (A. Ferreira). [In Portuguese & English.] Sobre a "keratomycosis nigricans palmaris." **On a Case of "Keratomycosis nigricans palmaris."**—*Rev. Med.-Cirurg. do Brasil*. 1930. Sept. Vol. 38. No. 9. In Portuguese pp. 337-340. With 2 figs. on 1 plate. In English pp. 341-344.

After a full discussion of the history of the disease, a case in a young child is described. There first appear small brownish macules, which slowly form groups and polycyclical patches. There is no erythema and practically no scaling, although the edges may be slightly raised. The palms are far more commonly affected than are other areas. The lesions vary from light brown to black in different cases, but are almost uniform in the individual patient. There is a good illustration and the article closes with an account of the characteristic features of *Cladosporium wernecki*.

M. S. T.

SILVA (Flaviano). A proposito da "tinea nigra" (keratomycosis nigricans palmaris). [**"Tinea nigra."**—*Brasil-Medico*. 1930. Oct. 25. Vol. 44. No. 43. pp. 1201-1204. With 3 text figs.

A medical student, aged 22, noticed some black spots at the root of the thumb and first two fingers of the left hand, palmar surface. Washing would not remove them, so he pricked them off with a pin, but 5 days later they reappeared. He again removed them, and then applied alcohol and tincture of iodine. They again recurred. The individual spots varied from mere pinpoints to 3 mm. in size. They caused no itching or discomfort except from their colour and situation. Seen by the author, the real condition was at once diagnosed and the *Cladosporon mansonii* (1905) isolated on Sabouraud's medium. The name *Cl. wernecki* was given by HORTA in 1921 to the same fungus.

H. H. S.

AARS (Charles G.). **Piedra**.—*Arch. Dermat. & Syph.* 1930. Sept. Vol. 22. No. 3. pp. 401-409. With 9 figs. [10 refs.]

An article based on 60 cases seen in Dutch Guiana. The fungus attacks the hair only and can be seen by the naked eye as small nodules on the shaft, somewhat resembling "nits." It causes no symptoms, and as the root is never affected, treatment with antiseptics, shaving, etc., is simple. The disease is not easily spread and experiments with river water were completely negative, which would seem to disprove the local belief that infection occurs as a result of such bathing. The fungus is not a true ectothrix as it does cause slight erosion of the cuticle. The nodules show perithecia with asci containing light fusiform spores. Cultures were all of the type Rabello-Mosta. The cases very closely resembled those seen in Brazil and Paraguay, where, however, the disease is less common.

M. S. T.

THONNARD-NEUMANN (Ernst), CAMACHO-MOYA (Jorge) & BREWSTER (K. C.). Klinische Beobachtungen bei Pinta (Carate) in Kolumbien. Ein vorläufiger Bericht. [**Clinical Observations on Pinta (Carate) as seen in Colombia.**]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1931. Jan. Vol. 35. No. 1. pp. 48-53. [United Fruit Co. Hosp., Santa Marta.]

Seventy-five cases were examined, and in 90 per cent. of them the Wassermann and Kahn reactions were positive, as compared with 40 per cent. in uninfected control cases. Only 15 per cent., however, gave a history of a primary chancre, 40 per cent. again being the figure obtained in controls. Radiography proved that 80 per cent. of the pinta patients suffered from aortic dilatation, whilst twenty out of thirty-four cases under the age of thirty showed definite signs of cardiac and vascular disease. The same percentage (eighty) had definite enlargement of the lymphatic glands, particularly the epitrochlear, and also had a symmetrical eruption. It is admitted that the work is far from complete, but the above findings lead to the hypothesis that pinta is not simply a dermatomycosis but is a systemic disease with marked epidermal changes.

M. S. T.

JONES (Jack W.) & ALDEN (Herbert S.). **Actinomycosis (Mycetoma): Report of Six Cases in Georgia.**—*Southern Med. Jl.* 1930. Oct. Vol. 23. No. 10. pp. 906-914. With 10 text figs. [21 refs.] [Med. School, Emory Univ., Atlanta, Ga.]

The author reviews the histories of actinomycosis and mycetoma very fully and points out that although they are caused by various fungi, these give rise to the same variety of tissue response. For this reason the terms may be considered synonymous, at least from a clinical point of view. The six cases are described in great detail, the head or neck being affected in all. The organism is often extremely difficult to find in the pus and even more difficult to cultivate. Granules are only found in long-standing cases, and for this reason many early lesions escape diagnosis. In suspected lesions the sinuses may be washed out with saline and their walls then curetted gently. The material thus obtained will give a large number of positive results when mounted in potash. The subsequent discussion revealed the opinion that the best treatment is the intravenous injection of Lugol's solution with or without an equal part of 20 per cent. sodium thiosulphate.

M. S. T.

GAY (Douglas M.) & BIGELOW (James B.). **Madura Foot due to *Monosporium apiospermum* in a Native American.**—*Amer. Jl. Path.* 1930. May. Vol. 6. No. 3. pp. 325-335. With 1 text fig. & 5 figs. on 2 plates. [11 refs.]

Seven other cases of infection with this fungus were found in the literature and are all reviewed fully in this article. Whilst these occurred in natives of Italy, Brazil and Algiers, the present case concerns a native white American male who has never been outside of the United States. The lesions, clinically typical of Madura foot, had lasted for ten years. They were unaffected by iodides, etc., and ultimately amputation was performed. The microscopical and biological characteristics of the organism are described in detail. The illustrations are good.

M. S. T.

VASUDEVAN (A.) & SESHADRINATHAN (N.). **A Few Atypical Cases of Mycetoma.**—*Indian Jl. Med. Res.* 1930. Oct. Vol. 18. No. 2. pp. 477–481. With 4 plates (1 coloured). [Med. College, Madras.]

A clinical and histological description of seven unusual specimens examined after amputation. In addition to five cases from the foot there were one from the knee joint and one mass from the gluteal region. In some there were encapsuled and spherical tumours which probably resulted from a successful localization by fibrous tissue response. Two cases were apparently caused by *N. bovis*, which is rare in S. India. The paper is well and amply illustrated.

M. S. T.

ARTOM (Mario). Micetoma actinomycosico del piede (piede di Madura). [**Actinomycotic Infection of the Foot.**]—*Giorn. Ital. Dermat. e Sifil.* 1930. Oct. Vol. 71. Year 65. No. 5. pp. 1516–1532. With 13 figs. (1 coloured) on 2 folding plates. [58 refs.]

A case of actinomycotic infection of the foot, contracted near Novara. The fungus was proved to be *Actinomyces bovis*. Treatment by K.I. and curettage.

H. H. S.

CAFFREY (P. J.). **Mycetoma in the Bornu Province of Northern Nigeria.**—*West African Med. Jl.* 1929. July. Vol. 3. No. 1. pp. 22–23. With 4 figs. on 1 plate. [3 refs.]

A detailed account of five cases encountered within three months. All the patients were well-nourished and exhibited no systemic disturbance, complaining only of neuralgic pains in the affected areas. One case was unusual in that the foot remained free from involvement although the leg above the ankle was extensively affected. In only one case was improvement noted, that patient being treated with daily intravenous injections of Lujol's iodine, starting with five minims and increasing by two minims daily to a maximum of thirty-four minims.

M. S. T.

KYRIASIDES (K. N.). Die in Griechenland bei Madurafuss (Mycetoma pedis) gefundenen Pilzarten. [**Fungi found in Madura Foot in Greece.**]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1929. Dec. Vol. 33. No. 12. pp. 656–660. With 2 text figs. [15 refs.]

KYRIAZIDÈS (K.). Champignons des mycetomes observés en Grèce. [**Fungi of Mycetomas observed in Greece.**]—*Ann. Parasit. Humaine et Comparée.* 1930. Mar. 1. Vol. 8. No. 2. pp. 194–200. With 2 text figs. [6 refs.] [Evangelismos Hosp., Athens.]

Of the 8 cases of mycetoma which have been observed in Greece 5 have been shown by cultures to be due to *Streptothrix* [*Actinomyces*] *madurae* (Vincent). Of the remaining 3 cases, 2 have been diagnosed microscopically, and 1 by cultures, to be due to *Indiella reynieri* Brumpt.

P. Tate.

AARS (Charles G.). **Madura Foot: its Histology and Mycology.**—*Arch. Dermat. & Syph.* 1930. Apr. Vol. 21. No. 4. pp. 570-574. With 3 text figs. [6 refs.]

The first recorded case of mycetoma pedis in Dutch Guiana is briefly described. It occurred in a woman aged 41, and was apparently due to *Actinomyces madurae*. Treatment with large doses of potassium iodide was ineffective.

P. Tate.

JONES (Jack W.) & ALDEN (Herbert S.). **Maduromycotic Mycetoma (Madura Foot): Report of a Case occurring in an American Negro.**—*Jl. Amer. Med. Assoc.* 1931. Jan. 24. Vol. 96. No. 4. pp. 256-260. With 8 text figs. [11 refs.] [Med. School, Emory Univ., Atlanta, Ga.]

A typical case of fifteen years' duration seen in a negro aged fifty-five. For twenty-five years he had lived in Atlanta, Georgia, where he came under observation. White granules were found, whilst the cultural and morphologic characteristics of the fungus are described in detail and classify it as *Scedosporium apiospermum*. The illustrations are excellent.

M. S. T.

BLANC (Georges), JOANNIDÈS (G.) & PAPAIOANNOU (A.). Sur un cas de pied de Madura à grains blancs causé par *Actinomyces Madurae*. [A Case of Madura Foot showing "White Bodies" and caused by *Actinomyces Madurae*.]—*Arch. Inst. Pasteur Hellénique.* 1930. Vol. 2. No. 2. pp. 335-338. With 4 figs. on 3 plates. [4 refs.]

A woman aged 70, seen in May 1930 in Athens, the disease then having been present in the left foot for about two years. The case being typical, the greater part of the article is devoted to a description of the organism and its cultures. The illustrations are poor.

M. S. T.

DA FONSECA (Olympio), Jr. & LEÃO (A. E. de Arêa). [In Portuguese & English.] As Chromoblastomycoses. **Chromoblastomycosis.**—*Rev. Med.-Cirurg. do Brasil.* 1930. June. Vol. 38. No. 6. In Portuguese pp. 197-216. In English pp. 216-236. With 8 figs. on 3 plates. [2 pages of refs.]

A detailed account of all the investigations which have hitherto been carried out into the causes of tropical verrucous dermatites, with special reference to *Phialophora verrucosa* and allied organisms. A detailed account is given of the case of chromoblastomycosis observed by MEDLAR & LANE in the United States. Apart from this one example, all other cases of this disease have been observed in Brazil and have been caused by *Acrotheca pedrosoi*. Seventeen cases are reported in detail. Clinically all show nodules, ulcers and warty growths on the feet. The histology, cultural characteristics and morphology are all fully described. The cases are all blastomycoses, the prefix "chromo-" being added as the cultures of the causative organism are a dark greenish grey in colour, sometimes with a tinge of violet.

M. S. T.

BONNE (C.). Sur la présence de la chromoblastomycose aux Indes orientales néerlandaises. [**Chromoblastomycosis in the Dutch East Indies.**]—*Bull. Soc. Path. Exot.* 1930. Oct. 8. Vol. 23. No. 8. pp. 765-766. [9 refs.] [Path. Inst., Batavia, Java.]

A full clinical description of the first typical case seen in Sumatra. Cultures have so far been unsuccessful. Reference is also made to a second case, but the chief value of the note lies in the complete bibliography.

M. S. T.

SILVA (Flaviano) & DE ARAUJO (Eduardo). Caso de chromoblastomycose. [**A Case of Chromoblastomycosis.**]—*Brasil-Medico.* 1930. May 17. Vol. 44. No. 20. pp. 539-541. With 5 text figs. English summary p. 541.

The patient was a man of 52 years. In 1913 an ulcer formed on the right great toe which healed after cauterization. Four years later, nodules appeared on the dorsum of the foot and this and the lower half of the leg became involved in a verrucose growth, with foci of infiltration and cicatrization. Cultural attempts in Sabouraud's medium were unsuccessful but sections of the tissue showed giant cells, leucocytic infiltration, small collections of pus, and rounded vesicular bodies of a dark brown colour which have been described by others in similar cases and denominated *Acrotheca pedrosoi*.

H. H. S.

PAZIENZA (Mario). Su di un raro caso di saccaromicosi cutanea a localizzazioni multiple. [**A Rare Case of Multiple Cutaneous Mycosis.**]—*Riforma Med.* 1930. Feb. 17. Vol. 46. No. 7. pp. 244-246, 249-250. With 8 text figs. [8 refs.] [Surg. Clinic & Hosp. for Incurables, Naples.]

The patient was a man of 31 years presenting an ulcer of a granulomatous character the size of the palm, occupying the middle third of the right calf. It had first appeared as a minute itchy swelling a year previously. There was a smaller sore on the left internal malleolus. No treatment was of any avail and the right leg was amputated. Later a large ulcer spread over the left leg, which in turn was amputated, but subsequently an enormous ulcer covered the stump of the latter to the groin; others appeared on the arms and the left side of the face, and death occurred some seven months later after he had left hospital. Certain bodies were seen in the tissue of the amputated limbs and culture enabled them to be identified as *Cryptococcus hominis*.

The pathogenicity of the organism, however, does not appear to have been firmly established.

H. H. S.

FISCHER (W. O.). **Treatment of Tropical Ulcer.**—*Jl. Med. Assoc. South Africa.* 1930. Nov. 8. Vol. 4. No. 21. pp. 647-648.

An account of work in Northern Rhodesia, in which the author states his definite belief that *Spirochaeta vincenti* is the causative organism. Excellent results were obtained by the intramuscular injection of 2 cc. of "novasurol" on alternate days. This is a water-soluble mercurial preparation which is made up in 2 cc. ampoules of a 10 per cent. solution by Bayer. 33 cases were studied and in all except 5 no spirochaetes were found after the third injection, their disappearance always being coincident with the loss of the foetid odour. Local antiseptics and daily spraying with 2 cc. of novasurol proved an important part of the treatment.

M. S. T.

TARAMELLI. Sur le traitement de l' "ulcus tropicum." [**The Treatment of Tropical Ulcer.**].—*Ann. Soc. Belge de Méd. Trop.* 1930. June 30. Vol. 10. No. 2. pp. 223–230.

An account of work carried out among the native troops in Italian Somaliland. Intravenous injections of Neojacol (914) are given every 5–6 days on about three occasions. The ulcer is washed thoroughly with benzine [benzol: the coal-tar derivative] and an occlusive caoutchouc dressing (Leukoplast Erba) is applied. This is carried out daily until the discharge has disappeared; it is then repeated every 4–5 days until healing is complete. It is stated that the resulting scars are always sound, supple and non-adherent.

M. S. T.

BOUFFARD (G.). L'ulcère phagédénique et son traitement. [**Tropical Ulcer and Its Treatment.**].—*Bull. Soc. Path. Exot.* 1930. May 14. Vol. 23. No. 5. pp. 483–491.

A paper evidently based on extensive personal experience in the French Sudan, Dahomey, Ivory Coast and Madagascar. It is definitely stated that the cause is to be found in Vincent's organism. This attacks tissues of lowered vitality and it is "for this reason that disastrous effects often follow caustic treatments and surgical intervention when thorough eradication of the organism has not been first attained." A breach of surface is not essential for infection, for occasionally a pustule appears on unbroken skin and from it a pure growth of the organism may be obtained. Although the disease commonly attacks debilitated individuals, otherwise healthy victims are not rare. Virulence is increased by passage through many patients, and it is in these circumstances that tropical ulcer may become epidemic, e.g., in barracks.

In discussing prophylaxis, stress is laid on the need of well-fitting boots and on frequent bathing with a 10 per cent. aqueous solution of methylene blue. All traumatic wounds may be dressed with this or with stovarsol powder. All definite cases should be isolated in hospital.

"Tropical ulcer does ultimately proceed to spontaneous cure, but the resulting scars are then usually extensive, adherent and disabling." Only two fatal cases have been seen by the author and in them the septicaemia was complicated by the presence of streptococci. Great stress is laid on the fact that the disease does not confer immunity.

The question of treatment is discussed in great detail and contains many references. The author deplures all caustic and surgical methods, nor has he ever seen any good result from intravenous arsenical therapy. In particular he praises frequent local dressings with 3 per cent. N.A.B. in glycerine, the wound being washed thoroughly with boiled water before each application. After 4 or 5 days the ulcer is usually clean and may be healed under 10 per cent. picric acid lotion or a menthol ointment. Other methods recommended are the polyvalent lipovaccine of Lemoignio, 1 per cent. oil of chenopodium in oil of almonds and a powder consisting of 4 per cent. iodoform, 10 per cent. bismuth subnitrate and 86 per cent. Vincent's powder.

M. S. T.

DE PAOLI (Paolo). La cura specifica dell'ulcera tropicale fagedenica. [**Specific Treatment of Tropical Phagedaena.**]—*Arch. Ital. Sci. Med. Colon.* 1930. June 1. Vol. 11. No. 6. pp. 332-337. [9 refs.] English summary (6 lines) p. 337.

The author working in Somaliland and Eritrea used arsenic (neosalvarsan mostly) and bismuth preparations. Of the latter he preferred Bismoxyl Bernocco (an oily suspension of the metal) and a colloid Bismuthoidol, by injection, and locally trepol in powder. He found the bismuth quite as efficacious as the arsenic, and prefers it because of its cheapness and the less risk of its giving rise to toxic symptoms.

H. H. S.

NORMET (Léon), HASLE (G.) & NGUYỄN-DUY-HA. Traitement des ulcères phagédéniques à fusospirilles par la vaccination locale spécifique. [**The Treatment of Tropical Ulcers by the Local Application of a Vaccine.**]—*Bull. Soc. Méd.-Chirurg. Indochine.* 1930. July. Vol. 8. No. 7. pp. 734-737. With 3 text figs.

An account of two cases in which the spirilla and fusiform organisms were found. A lipo-vaccine (the French antiphagedaenic) was rubbed in thoroughly and then applied as a wet dressing twice a day. Organisms disappeared within a week and healing was complete in 3-4 weeks.

M. S. T.

GARRY (Gerschon). Ulcus epidemicum. [**Ulcus epidemicum.**]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1930. July. Vol. 34. No. 7. pp. 351-354. With 1 text fig.

This paper is based on 100 cases seen during an epidemic in Palestine which lasted from August to December 1920. The patients were mostly children of the poorer classes, females predominating. The ulcers were mostly solitary and affected the lower third of the leg. Smears from them showed Gram-positive bacilli resembling Vincent's organism, but no spirilla were seen. Attempts at cultivation were unsuccessful. After 24 hours the original papule becomes a pustule, surrounded by erythema. Two to three days later this has formed a scab covering an ulcer of 4 cm. diameter, the edges of which are punched out but not undermined. A surrounding zone of oedema and brownish-red discoloration is then present, but lymphangitis does not occur. Although the ulcers are very painful and there is some rise in temperature, their course is mild, spontaneous healing usually taking place within three months. It is for these reasons that the author differentiates the lesions from those of *Ulcus tropicum*, of which, however, it may be a benign form. Novarsenobillon locally and intravenously proved valueless. Healing seemed to be expedited by wet dressings of sour milk, followed by saline.

[The author does not say whether he examined for the diphtheria bacillus. See this *Bulletin*, Vol. 16, p. 153.]

M. S. T.

WALKINGSHAW (R.). **The Healing of Ulcers.**—*Malayan Med. Jl.* 1930. June. Vol. 5. No. 2. p. 65.

The paper deals with the treatment of tropical ulcers as carried out in the hospital wards of Singapore. Mechanical cleansing with saline swabs is followed by hot saline baths twice a day; after each of these

the ulcer is treated with hydrogen peroxide. Between whiles saline fomentations are applied 4-hourly. Also "substitute a cold compress of 1/60 carbolic lotion for one of the middle-day fomentations." When thoroughly clean, 1 in 2,000 Acriflavine solution is applied to the floor of the ulcer and a "plain 4-hourly foment is placed on top." When the granulations are level with the skin surface, a dressing of normal horse serum is applied and left undisturbed for 4-6 days. This is then removed by soaking in saline and the dressing repeated until healing ensues.

M. S. T.

BERLIN (Chaim). Feigenbaumdermatitis. [**Dermatitis due to the Figtree.**].—*Dermat. Woch.* 1930. May 31. Vol. 90. No. 22. pp. 733-736. [5 refs.]

A typical dermatitis venenata, seen in Palestine towards the end of summer. The victims are mostly boys between the ages of six and twelve years. Though all exposed surfaces may be affected, the hands are the most common site, whilst occasionally the vesicles, etc., may be seen round the mouth. As the children climb the trees barefooted, the lesions are often seen on the feet. The sticky and milky sap of *Ficus Carica* seems to be definitely responsible in sensitive individuals. It is claimed that these are the first cases of figtree dermatitis to be reported.

M. S. T.

DI LULLO (Orestes). El paaj. Una nueva dermatitis venenata. [**Paaj. A New Form of Dermatitis Venenata.**].—Universidad de Buenos Aires, Misión de Estudios de Patología Regional Argentina. Monografía No. 2. 1930. 80 pp. [18 refs.]

This monograph is divided into two parts, the first mainly clinical, the second experimental. The former is practically a reprint of an article published in 1927 and already summarized (see this *Bulletin*, Vol. 25, p. 699). Paaj or "quebracho disease" is the name given to an irritative skin condition set up by contact with the leaves, flowers, fruit and probably the wood itself of *Schinopsis lorenzii*, one of the Anacardiaceae. The statement has been made that the pollen can also give rise to it, but the author, after his experiments, denies this. These experiments have been carried out with alcoholic extracts of various strengths, with distillates, ethereal extracts, etc., of fresh leaves. Nearly 200 tests have been made altogether, and he finds that all persons are not equally susceptible, though contact, even repeated, does not lead to immunity. By using "tinctures" (extracts in 95 per cent. alcohol) of varying strengths from 0.001 to 10 per cent. a grading of susceptibility can be determined. *Schinopsis lorenzii* is not among those mentioned in the text-books as setting up dermatitis venenata.

H. H. S.

HUME (Edgar Erskine). **Wet Sand Creeping Eruption at the Largest American Army Station.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1930. Nov. 25. Vol. 24. No. 3. pp. 313-326. With 5 figs. on 2 plates. [4 pages of refs.]

Contains a lucid history of all investigations, etc., since the disease was first described in 1874. The larvae seen in these Georgia cases

were all *Ancylostoma braziliense*, the temperature, humidity and sandy soil proving very favourable to their development. Whilst dogs and cats have been proved to act as hosts, pigs have not yet been incriminated. The disease was more common in children and persons of fair complexion. It starts as an urticarial papule which lasts for 3 or 4 days, after which there appears the characteristic linear, tortuous and serpiginous eruption, accompanied by intense itching, which day by day extends at one end, fading at the other. The rate of migration varies, averaging one-half to one inch in the twenty-four hours. The burrow usually becomes filled with serous exudate and is then secondarily infected. In untreated cases, the individual lesions are self-limited, the worm dying in the skin within a few weeks. The local treatment is applied where the itching is most intense, i.e., usually slightly in advance of the visible lesion. This area is frozen by the ethyl chloride spray for two minutes. It is then covered with wet dressings of boric acid and aluminium acetate. Over this is placed an ice-pack, the process being continued until itching vanishes and no activity is seen. The resulting desquamation then requires a paraffin ointment containing 2 per cent. of salicylic acid and 10 per cent. of boric acid. The illustrations are good, and the bibliography very full.

M. S. T.

LE SUEUR (Elizabeth) & HUTCHISON (William). **A Note on the Treatment of Creeping Eruption with External Application of Oil of Chenopodium.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1930. Nov. 25. Vol. 24. No. 3. pp. 327-329.

An account of two cases seen in Sarawak, both being Europeans and in both *Ancylostoma caninum* being responsible. Infection was acquired in a swampy part of the golf course which is frequented by pariah dogs heavily infected with this parasite. Many treatments proved unavailing, cure at length being obtained by rubbing oil of chenopodium into the track for ten minutes. Subsequently 1 part of this oil was mixed with 3 parts of castor oil, the mixture being applied in the same way. Whilst the one application to one area was sufficient, it took 10 to 14 days to work over both feet in each case.

M. S. T.

FUSE (Shiro). *Dermatitis linearis*. [**Dermatitis linearis.**]—*Japan. Jl. Dermat. & Urol.* 1930. May. Vol. 30. No. 6. pp. 537-553. With 9 text figs. [8 refs.] [In Japanese. German summary p. 57.] [*Dermat.-Urol. Clinic, Kyushu Med. Acad., Kurume.*]

Occurring chiefly in summer, this dermatitis first appears as an erythema on exposed surfaces. Yellowish, miliary pustules quickly supervene. Healing may occur at this stage, but more commonly confluence of the pustules is next seen to form greyish sheets the size of a finger tip. These then heal spontaneously in about a week, leaving some pigmentation behind. Burning and pricking sensations are felt throughout the course of the eruption. Although the matter is not yet proved, the author believes the eruption to be due to "*Päderus idae* Lewis," and so is closely related to the similar diseases seen in Java, India, Congo, Brazil, and elsewhere.

M. S. T.

BARADA (K.). **The Treatment of Eczema by Sodium Bicarbonate in the Tropics.**—*Jl. Egyptian Med. Assoc.* 1931. Feb. Vol. 14. No. 2. pp. 123-125.

In patients who are otherwise apparently healthy but who are suffering from an acute generalized weeping eczema, the author claims striking success with the following drastic treatment. After a very light breakfast 0.3 cc. of camphor oil is injected subcutaneously and hot bottles are also placed round the feet. Then 100 cc. of a 10 per cent. solution of pure sodium bicarbonate is injected intravenously and very slowly. In spite of the above precautions to prevent shock, the respiration gets slower and the pulse weaker. Rigors and a "slight loss of consciousness" sometimes occur. Reaction follows within thirty minutes and lasts three to five hours, with vomiting, shivering and a rise of temperature. Patients are kept in bed for twenty-four hours and the diet is restricted to milk for that period. After a few days a second injection may be necessary, sometimes even a third, but the reaction decreases with each. The cases cited are striking.

M. S. T.

WEHRLE (W. O.) Erfahrungen ueber den "Roten Hund" und dessen Behandlung. [**Prickly Heat and its Treatment (in Liberia).**]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1931. Jan. Vol. 35. No. 1. pp. 53-56.

It is noted that predisposition, race, work, etc., all play their part in the causation of prickly heat, and for this reason prophylaxis is not very hopeful. Whilst powders and ointments are sometimes useful in slight cases, Europeans severely affected can only be cured by a change of climate. The author claims that autohaemotherapy not only shortens the attack but that a few injections are always followed by complete disappearance of the irritation. So far he has never had to give more than eight injections of 1 to 4 cc. at 3 to 4-day intervals.

M. S. T.

FACIO (Ludovico). A propósito de una dermatosis regional argentina. Prurigo simple agudo con liquenificación circumscripta de la Patagonia. [**A Regional Dermatitis in the Argentine. Prurigo with Lichenification.**]—*Semana Méd.* 1930. July 17. Vol. 37. No. 29 (1905). pp. 172-191. With 16 text figs.

The author states that he has seen more than 300 cases of this condition and gives details of eight. All those attacked are young adults of the rural population. After a brief period, 24 hours or so of gastrointestinal disturbance, nausea, abdominal pains and diarrhoea, the rash begins to appear on parts usually uncovered, arms, legs and face, generally in the night after an hour or two of intense itching. The eruption passes through three stages: (1) Raised papules topped with a vesicle containing opalescent fluid, coming out during 5 to 8 days; during this period the itching is intense but paroxysmal. (2) The papules give place to a so-called "lichenoid condition" covered with small adherent scabs, often with black crusts of dried blood from scratching. (3) Gradual dying away unless scratching has led to secondary pyogenic infection. There is no fever and the gastro-

intestinal symptoms pass off when the rash appears. If scratching can be resisted the individual spots disappear in a few hours, otherwise the lesions remain for 25 to 30 days. It is clearly of the nature of an intoxication, like urticaria, probably of alimentary origin. The author postulates a predisposing disturbance of hepatic function followed by intestinal intoxication of an allergic character from hypersensibility to albumen of animal origin (meats, eggs, milk). Treatment is dietetic and symptomatic.

H. H. S.

SMITH (E. C.). **Facial Tuberculosis in Nigeria.**—*Jl. Trop. Med. & Hyg.* 1930. May 15. Vol. 33. No. 10. pp. 133–134. [2 refs.] [Med. Research Inst., Lagos, Nigeria.]

The author describes two cases, the first a girl from Lagos aged 15 years and the second a boy from Northern Nigeria aged 10 years. In both the upper lips and alae nasi were affected. It was only when they proved resistant to N.A.B. that the possibility of tuberculosis was considered. Histologically large numbers of giant cells, round and plasma cells and necrotic zones were found. In tissue from the first patient acid-fast bacilli were seen, and some of this material produced facial ulceration after local injection into a monkey. Tissue from the monkey showed many such bacilli and produced tuberculosis in guineapigs.

M. S. T.

HÉRIVAU (A.). Tuberculose de la peau avec association putride secondaire chronique. Considérations sur les formes masquées de certaines tuberculoses cutanées exotiques. [**Tuberculosis Cutis with a Putrid Secondary Infection. Masked Types of Tuberculosis Cutis seen in the Tropics.**]—*Bull. Soc. Path. Exot.* 1930. June 11. Vol. 23. No. 6. pp. 672–680. With 2 text figs. [13 refs.] [Pasteur Inst., Antananarivo.]

A detailed clinical and pathological account of a lesion over the anterior aspect of the left ankle in a child aged eleven years. The lesion started four years before, was extremely malodorous and was accompanied by glandular enlargement. A series of crusted and painful ulcers exuded a thin, blood-stained pus from which a *Proteus* was cultivated. An autogenous vaccine was made from this organism and used for local treatment; the ulcers healed in twelve days. The lesion left was a typical tuberculosis verrucosus, a diagnosis confirmed by successful inoculation into a guineapig. After quoting numerous references the author concludes that typical tuberculosis cutis is rare in the tropics; on the other hand, the disease itself is not uncommon but is not recognized owing to the intense secondary infections which cause it to resemble mycosis.

M. S. T.

SMITH (E. C.). **Streptococcal Dermatitis.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1930. June 30. Vol. 24. No. 1. pp. 89–92. With 11 figs. on 3 plates. [Med. Research Inst., Lagos, Nigeria.]

The author divides the various types into three groups: Eczematoid lesions secondary to impetigo of the extremities, bullous eruptions most

common in infants and ulcerated lesions of a chronic character. [Whilst the illustrations are good, the first type does not seem to be sufficiently clearly differentiated from mycotic infections, the second group possibly confuses the true bullae of ordinary impetigo and bullous lichen urticatus, whilst the third type would seem to be ecthyma.] These criticisms may be unjust as it is clearly stated that all lesions heal rapidly under saline dressings or dusting with boric powder.

M. S. T.

SMITH (E. C.). **Sycosis Nuchae.**—*West African Med. Jl.* Lagos. 1930. Apr. Vol. 3. No. 4. p. 79. [3 refs.] [Med. Research Inst., Lagos.]

The article describes in detail all the stages of this chronic disease, good photographs illustrating each. It is probably a true sycosis, staphylococcal in origin. "The cases observed in Lagos were in fairly well-to-do Africans accustomed to wearing European clothes." The patients themselves invariably regard the condition as resulting from a visit to the barber and it is possible that the attentions of a careless barber will predispose to infection from a not over-clean collar.

M. S. T.

IBRAHIM (Aly). **A Rare Surgical Disease in Egypt.**—*Jl. Egyptian Med. Assoc.* 1930. Mar. Vol. 13. No. 3. pp. 66-68. With 3 figs. on 1 plate. [6 refs.]

During the past 20 years the author has seen the three cases on which this article is based, all being men over thirty years of age who had all suffered for over ten years when first seen. The disease starts as a globular swelling in the dermis. It is freely movable over the subjacent tissues and is of the size of a pea. It "soon" becomes slightly raised, the centre then reddens and fluctuates. On breaking down, the sero-purulent discharge has a very characteristic smell. On healing, however, other nodules appear in the vicinity. Sometimes several such abscesses may coalesce and leave short fistulae. The sites of election are the scrotum and perineum, together with the neighbouring "soft-skinned" parts. It may appear in the axillae. All investigations have proved negative. A blood-picture is given, but whilst the differential white cell count is noted the total number of whites is not mentioned. There is no account of attempted treatment or of the ultimate history of the patients.

M. S. T.

MESSIMY (Robert). **Vitiligo géant chez les indigènes du Maroc.** [**Giant Vitiligo in the Natives of Morocco.**]—*Bull Soc. Path. Exot.* 1930. June 11. Vol. 23. No. 6. pp. 576-581. With 1 text fig.

The author states that this disease is known locally as "Baras" and has been confused with leprosy and syphilis. Twenty cases, all in Berbers, were observed. The affection usually starts with one leucodermic patch on an extremity; after a short time other foci appear on the trunk. These gradually enlarge until, 15 to 20 years after the onset, there is nearly total decoloration of the trunk. At these times the limbs are only partially but symmetrically affected. The face

becomes attacked for the first time 25–40 years after the appearance of the first patch. Clinical and pathological examinations and investigations of past and family histories have yielded no clue as to the cause although the author inclines to the view that it will be found in the nervous system.

M. S. T.

BURGESS (J. F.) & USHER (B.). **On Hypersensitiveness to Quinine.**—*Canadian Med. Assoc. Jl.* 1930. July. Vol. 23. No. 1. pp. 45–48. [General Hosp., Montreal.]

In Canada there is a frequent incidence of dermatitis of the beard region. For this various "after-shave" face lotions have been held responsible. The Canadian Government demands that such alcoholic lotions contain quinine or diethylphenylphthalate, but actually quinine is used almost without exception. Two hundred patients from the skin clinic were chosen at random and the forearms tested with glycerine, alcohol, essential oils, half per cent. lotions of quinine and of colocynth, as well as two proprietary lotions "X" and "Y," the former containing half per cent. of quinine and the latter the same amount of colocynth. Reactions were considered positive only when erythema was accompanied by vesiculation or exudation. A series of patients who were suspected to be suffering from "X" dermatitis were similarly tested. In the first group only one case reacted and this did so both to "X" and the quinine lotion only. Therefore it is unlikely that a quinine idiosyncrasy is responsible. Ten cases of the second group are reported in detail and they prove that quinine only is responsible, that the dermatitis is due to sensitization as a result of prolonged contact and that this sensitization may be local or general.

M. S. T.

HASSELMANN (C. M.) & MIYAO (Isao). Ein erstmalig bei einem Japanerkind in den Tropen beobachteter Fall von Pemphigus vulgaris, vegetans et foliaceus. [**The First Case of Pemphigus Vulgaris in the Tropics observed in a Japanese Child.**]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1930. June. Vol. 34. No. 6. pp. 295–299. With 2 text figs. [17 refs.]

This disease is very uncommon among the Japanese. The article describes in great detail the fatal case of a boy aged 1½ years resident in Manila. Not only were the lesions characteristic of Pemphigus vulgaris present, but there were also areas typical of P. vegetans and P. foliaceus. Pathological investigations, etc., yielded no findings of importance.

M. S. T.

MAKEL (H. P.). "**Ainhum.**"—*Milit. Surgeon.* 1930. May. Vol. 66. No. 5. pp. 693–695. [4 refs.]

Two cases recently seen in Colon are quoted: both were West Indian negroes and each showed the disease in one little toe only. The author then reviews the definition, history and suggested etiologies of the disease. An account of the pathology, treatment, etc., follows.

In conclusion it is stated that the above cases "seemed to be more of a sort of linear scleroderma in which the epidermis had hardened and shrunk compressing the papillary layer and causing pressure necrosis, obliterating arteritis, following with degeneration of all tissues of the toe, including the bone which was the seat of a rarefying osteitis."

M. S. T.

CASTELLO (P.) & MESTRE (J. J.). Ainhum. Algunas consideraciones referentes a dos casos coincidentes con Lepra y con Keratoderma palmo-plantar hereditaria. [**Ainhum. An Account of Two Cases in Patients also suffering from Leprosy and Congenital Keratoderma.**]—*Bol. Soc. cubana Dermat. y. Sifil.* 1929. Oct. Vol. 1. No. 3. p. 193. With 2 figs. [Summarized in *Bull. Inst. Pasteur.* 1930. May 31. Vol. 28. No. 10. p. 463.]

Only six cases of ainhum have been seen by the author during the last fifteen years in Cuba. One negress was interesting in that 3 cases of ainhum and 4 of keratoderma have appeared in 3 generations of her family.

M. S. T.

HERMANS (E. H.). Een geval van ainhum. [**A Case of Ainhum.**]—*Nederl. Tijdschr. v. Geneesk.* 1930. Apr. 12. 74th Year. 1st Half. No. 15. pp. 1886-1891. With 1 text fig. & 2 figs. on 1 plate. [12 refs.]

The case, which was a typical one, occurred in an Indian sailor and the disease affected the little toe of either foot. Sections were made to include the groove at the base of the toe where the condition was still in an early stage. These showed atrophy of all layers of the epidermis instead of thickening. The stratum granulosum, which is normally 3 to 4 cell layers thick, was reduced to a one-cell layer. In the dermis the collagenous connective tissue of the corium was reduced in amount and there was no trace of any inflammatory cell reaction. No trace, likewise, of scar tissue could be observed. All the various suggestions as to the etiology of the condition are considered—leprosy, trophoneurosis, artificial constriction and inflammatory affection of fissures produced by trauma. The positive outcome of the investigation of this case is that it affords no evidence that an infection with an inflammatory reaction is the cause of ainhum.

W. F. Harvey.

AUBRY (Georges). Un cas d'ainhum chez un Européen. [**Ainhum in a European.**]—*Bull. et Mém. Soc. Méd. Hôpit. de Paris.* 1930. July 21. Year 46. 3rd Ser. No. 25. pp. 1361-1363.

A typical case of ainhum affecting the right fifth toe, of nine months' duration. The patient was a man aged 50, of Italian parentage but born in Algiers. The time during which he has lived in Paris is not, however, mentioned. The patient has some degree of arterio-sclerosis, but all investigations of the endocrine and central nervous systems gave negative results.

M. S. T.

RABELLO (Ed.) Filho. [In Portuguese & English.] Contribuição para a questão das "Botryomycoses." **Contribution to the Study of "Botryomycosis."**—*Rev. Med.-Cirurg. do Brasil.* 1930. Apr. Vol. 38. No. 4. In Portuguese pp. 127-132. With 3 text figs. In English pp. 133-135. [Med. School, Univ., Rio de Janeiro.]

Two cases of the rare disease of man called botryomycosis are briefly described. The condition usually simulates actinomycosis but the grains

are formed of masses of staphylococci. The author favours a return to the name " botryosis " for this disease.

P. Tate.

GAMBIER (A.). Mycétome probable du pied.—*Bull. Soc. Méd.-Chirurg. Indochine*. 1930. July. Vol. 8. No. 7. pp. 753-755. With 1 text fig.

DA FONSECA (Olympio), Jr. O genero Trichosporon. Trichosporoses ou trichomycoses nodosas, piedra européa, piedra asiatica e piedra americana.—*Rev. Med.-Cirurg. do Brasil*. 1930. July. Vol. 38. No. 7. pp. 251-261. With 5 text figs.

DA FONSECA (Olympio), Jr. O genero Madurella, e os mycetomas produzidos pelas especies nelle contidas.—*Rev. Med.-Cirurg. do Brasil*. 1930. July. Vol. 38. No. 7. pp. 262-269. With 2 text figs.

TATE (P.). The Dermatophytes or Ringworm Fungi.—*Biol. Reviews*. 1929. Vol. 4. pp. 41-75. With 7 plates. [39 refs.] [Molteno Inst., Univ., Cambridge.]

TROPICAL MYCOLOGY.

LANGERON (Maurice). Revue des travaux de mycologie pathologique exotique publiés au cours des années 1927-1928. [**Review of Works on Tropical Pathological Mycology published during 1927-1928.**]—Reprinted from *Ann. de Cryptogamie Exot.* 1930. Apr. Vol. 3. No. 1. pp. 13-42. [8 pages of refs.]

This paper is a very useful critical review of work published during the years 1927-1928, in which the real advances in knowledge of pathogenic fungi are well brought out. Under the section Phycomycetes, rhinosporidiosis and coccidioidal granuloma are considered. Under Ascomycetes are included Brazilian and Paraguayan "Piedra." Under Hyphomycetes are considered the Dermatophytes in the broad sense separated into Closterosporaceae; Aleuriosporaceae; Conidiosporaceae; and Blastosporaceae. Under the latter heading blastomycoses in general; pulmonary blastomycoses; "thrush" and glossitis; and cutaneous blastomycoses, are dealt with. The last section deals with the fungi of mycetomas, under the headings Actinomycotic mycetomas, and Maduromycoses. In addition to a full bibliography, a list of all the new genera and species mentioned in the review is appended.

P. Tate.

TALICE (R. V.). Le facteur pH en mycologie. Son influence sur la culture de certaines espèces de champignons parasites de l'homme. [**The pH Factor in Mycology.**]—*Ann. Parasit. Humaine et Comparée.* 1930. Mar. 1. Vol. 8. No. 2. pp. 183-188. With 1 text fig. [14 refs.] [Hyg. Inst., Montevideo.]

The growth of 30 species of fungi was observed over a pH range of pH 2.2 to pH 9.6, the media employed being Raulin, ordinary glucose agar and Sabouraud's "proof" and "preserving" media. The results show that the maximum and minimum reaction for all the species are widely separated and that in most cases optimum growth takes place over a fairly wide range of pH. The optimum range for most species is in the region of pH 5-7, but in *Saccharomyces* it is about pH 3.

P. T.

JAUSION (Hubert) & SOHIER (Roger). Les claso-vaccins: vaccinothérapie des dermatomycoses et de leurs séquelles allergiques. [**Claso-Vaccines: Vaccinotherapy of the Dermatomycoses and their Allergic Sequelae.**]—*Presse Méd.* 1930. May 7. Vol. 38. No. 37. pp. 621-625. With 6 text figs.

The authors claim to have met with a great measure of success by treating dermatomycoses with a mixed vaccine prepared as follows:—The fungi used are *Trichophyton crateriforme*, *T. acuminatum*, *T. cerebriforme*, *T. lacticolor*, *T. radians*, *Microsporum audouinii*, *Achorion schönleini*, *Epidermophyton inguinale*, *E. interdigitale*, and *Sporotrichum beurmanni*. Cultures are grown for two months at laboratory temperature on liquid honey medium in Roux flasks. The liquid is

filtered off, the fluid forming the "toxin filtrate," and the mycelial masses are mixed and treated with nitric acid, first cold and then boiled for 1 hour on a water bath. The acid is neutralized with normal soda, using litmus paper as indicator, and filtered. A drop of "phénosalyl" is added to each 2 cc. of the filtrate, which is distributed in sterile ampoules and forms the claso-vaccine.

Diagnosis was confirmed by intradermal reaction with trichophytine before injecting the claso-vaccine. The usual course consists of a series of 6 injections, 1/2 cc., 1 cc., 1 1/2 cc., 2 cc., 2 1/2 cc., 3 cc., at intervals of 5 days; but, if necessary, twice the number of injections may be given.

The results of treating 45 cases of dermatomycoses are given, together with short clinical histories of the cases. 36 were cured; 9 improved; and 3 had relapses. Of the nine cases which showed only improvement, 7 were cases of pityriasis versicolor. The cured cases included: scalp trichophytosis, 1; favus, 1; sporotrichosis, 1; kériion of Celsus, 1; trichophytic sycosis, 1; herpes circinata, 9; eczema marginatum of Hebra, 7; erythrasma, 2; mycotic intertigo, 3.

In addition 17 cases of eczema associated with past or present dermatomycoses, and including parakeratoses psoriasiformes, eczematides pityriasiformes and trichophytides psoriasiformes and licheniformes, were treated in a similar manner and resulted in 10 cures and 10 improvements, but after cure there were relapses in 3 cases.

P. T.

- i. ASHFORD (Bailey K.). **Significance of Mycology in Tropical Medicine.**—*Arch. Dermat. & Syph.* 1930. July. Vol. 22. No. 1. pp. 7-33. With 3 text figs. [4 pages of refs.]
- ii. ——. **Sporotrichosis.**—*Bol. Assoc. Méd. de Puerto Rico.* 1930. Aug. Vol. 22. No. 179. pp. 127-133.

i. The first paper is a general review of the fungi which cause mycoses in tropical countries, in which the author points out that from one-third to one-half of tropical skin diseases are of mycotic origin. He emphasizes that probably all pathogenic fungi are primarily saprophytic, and that the condition of the host is of great importance in regard to their becoming parasitic. Blastomycoses, dermatomycoses, sporotrichosis, mycetoma, actinomycoses, and a number of uncommon diseases caused by Ascomycetes and Phycomycetes are included in the review.

ii. The second paper consists of a review of the etiological, geographical, clinical and laboratory aspects of sporotrichosis.

P. T.

- IN (Keiden). **A Study of Dermatophytes along the Shores of the Lower Course of the Yang-Tse-Kiang.** (I.)—*Japan. Jl. Dermat. & Urol.* 1929. Sept. Vol. 29. No. 9. pp. 879-906. With 34 text figs. & 4 figs. on 1 plate. [In Japanese. English summary pp. 59-62.] [Dermat. Clinic, Imperial Univ., Tokyo.]

In the course of this investigation 127 cultures were obtained from infected material. The author found that the term "la-li-dau" is used exclusively for favus; and in 48 out of 49 cases diagnosed as "la-li-dau" cultures of *Achorion schönleinii* were obtained. The

remaining case clinically resembled favus; but the fungus isolated differs in cultural characters and in morphology from the known species of *Achorion* and appears to be a new species of this genus. Inoculation was positive for rabbits, and on the glabrous skin of man, but negative for guineapig, mice and chicken.

P. T.

FRAZIER (Chester N.), KUROCHKIN (T. J.) & MU (Jui-wu). **Types of Dermatomyces isolated from Scalp Infections in Peiping.**—*Nat. Med. Jl. China*. 1930. Apr.–June. Vol. 16. Nos. 2 & 3. pp. 168–170. [2 refs.] [Peiping Union Med. College, Peking.]

In general hospital practice examination of 165 cases of scalp ring-worm showed that *Trichophyton violaceum*, *Microsporum ferrugineum* and *Trichophyton* "A" are the most common fungi; but *T. cerebriforme* and *Achorion schönleinii* were also found in a few cases. In 8 cases mixed infections were present. Four of these gave cultures of *M. ferrugineum* and *T. "A"*; and the other four gave cultures of *T. violaceum* and *M. ferrugineum*.

P. T.

CATANEI (A.). Cultures d'*Achorion schönleinii* et de *Trichophyton* sur milieux artificiels en présence de microbes et de produits microbiens ou sanguin. [**Cultures of *Achorion schönleinii* and *Trichophyton* on Artificial Media in the Presence of Bacteria and of Bacterial and Blood Extracts.**]—*Arch. Inst. Pasteur d'Algérie*. 1929. June. Vol. 7. No. 2. pp. 184–201. With 3 plates (1 coloured) & 1 text fig. [6 refs.] [Pasteur Inst. of Algeria, Algiers.]

In mixed cultures of *Achorion schönleinii* with a *Staphylococcus*, the fungus at first grows better than in pure culture, but the favourable effect ceases after a few weeks. This action is also shown by some bacilli and cocci. The favourable effect of the bacteria is reduced by their abundant presence in the mixed culture, and by a high temperature. The life of the mixed cultures is sometimes shorter than that of pure cultures. On favourable media the fungus benefits for the first few weeks if planted on a culture of bacteria previously grown on the medium, but on poor media the growth of the fungus is not improved. Slow growing *Trichophyton*s do not grow in mixed cultures; quickly growing species are retarded in mixed cultures at a temperature favouring the bacteria; and the bacteria have no effect at an unfavourable temperature in mixed culture with a rapidly growing *Trichophyton*. Small quantities of a *Staphylococcus* culture in broth killed by heat, of filtrate of such a culture, or of bacterial extract, favour the growth of *Achorion* in artificial media, but the action is temporary when the medium by itself is suitable for growth of the fungus.

P. T.

CATANEI (A.). Etude des modifications des caractères cultureux d'un *Trichophyton gypsum*. [**Study of the Cultural Modifications of a *Trichophyton gypsum*.**]—*Arch. Inst. Pasteur d'Algérie*. 1929. Sept.–Dec. Vol. 7. No. 3–4. pp. 287–302. With 3 plates. [3 refs.] [Pasteur Inst. of Algeria, Algiers.]

From cultures of a *Trichophyton gypsum* which differs slightly from *T. radiolatum* Sab. 1910, three variants, types 1 and 2 and a yellow type,

were obtained, which are stable in culture, and, like the primary cultures, may undergo white downy pleomorphic changes. The three types, which differ in cultural characters and in the relative degree of aleuric development, appear to form a series of gradations from the primary culture type to the completely pleomorphic white, downy, type. Two of the variants were stable through animal inoculation, but the third reverted either to the primary culture type or to that of the second variant.

P. T.

DE MAGALHÃES (Octavio). [In Portuguese & English.] Contribuição para o conhecimento das lesões provocadas pelo "*Oidium brasiliense*" (O. Magalhães—1914). **Contribution to the Knowledge of Lesions caused by the "*Oidium brasiliense*" (O. Magalhães 1914).**—*Mem. Inst. Oswaldo Cruz*. 1929. Vol. 22. In Portuguese pp. 27–36. With 28 plates (2 coloured). In English pp. 37–47. [With 88 pages of refs.]

The lesions produced by *Oidium brasiliense* in the various organs—heart, lungs, kidneys and adrenals, spleen, ganglia, thyroid, pancreas, liver—were studied in man, monkey, rat, mouse, guineapig and rabbit, and in the present paper a brief account of the type of lesions found in the different organs is given. The author's main points seem to be that the lesions are not specific for the organism and that in different tissues the organism may be present in a variety of forms—"coccus," "bacilli," "navette," "yeast," "mycelial," etc. [Unfortunately, the English translation is so bad that it is almost impossible to understand, and the immense bibliography appended is merely a haphazard collection of titles of papers, and summaries of papers, which touch on all aspects of mycology, and the vast majority of which have no bearing on the subject of the paper.]

P. T.

DE ALMEIDA (Floriano Paulo). Différences entre l'agent étiologique du granulome coccidioïdique des Etats-Unis et celui du Brésil. Nouveau genre pour le champignon brésilien. [Differences between the **Etiological Agents of Coccidioid Granuloma in the United States and in Brazil. New Genus for the Brazilian Fungus.**]—*C.R. Soc. Biol.* 1930. Nov. 4. Vol. 105. No. 29. pp. 315–316. [1 ref.]

The author suggests that owing to the cultural, morphological and pathogenic differences between the organisms found in coccidioid granuloma in the United States and in Brazil, the new genus *Paracoccidioides* should be founded for the United States fungus. The type species would be *Paracoccidioides brasiliensis* (Splendore 1912).

P. T.

PUNTONI (V.). Sur la pluralité des types de l'*Actinomyces bovis* Harz. [Plurality of *Actinomyces bovis* Harz.]—*C.R. Soc. Biol.* 1930. Feb. 7. Vol. 103. No. 5. pp. 303–305. [Bact. Inst., Univ., Rome.]

Cultures of 20 strains of *Actinomyces bovis* Harz, obtained from Italian and other institutes, were compared. The 20 strains varied and appeared to be composed of a number of distinct species. These species could be identified with previously known saprophytic species, namely, *A. sulphureus* Gasperini (12 strains); *A. albus* (Rossi-Doria) (1 strain); *A. chromogenes* Gasperini (1 strain); *A. albido-flavus* (Rossi-

Doria) (1 strain); and *A. carneus* (Rossi-Doria) (1 strain). From this the author concludes that actinomycosis with grains having clubs is due to species of *Actinomyces* well known as ordinary saprophytes; that the name *A. bovis* Harz should be abolished; and that the division of *Actinomyces* into *saprophytica* and *parasitica* cannot be retained.

P. T.

DE LA GUARDIA (Jaime). Breves notas sobre un caso de actinomicosis. [**Brief Notes of a Case of Actinomycosis.**]—*Cronica Méd.-Quirurg. Habana*. 1930. Mar. Vol. 56. No. 3. pp. 114-121. With 7 figs.

The patient, a woman of 20 years, engaged in domestic work, gave a 5 months' history of pain over the right lower jaw. This had been ascribed to caries of the teeth which were extracted. The pain continued and swelling began two months later affecting the whole of the right side of the face and a fungating ulcer appeared externally at the angle of the mandible. The ray fungus was cultivated from it. Treatment by excision and scraping, cauterizing with pure carbolic acid and dressing with Lugol's iodine, together with administration of potassium iodide by mouth following six injections of 2 gm. of the sodium salt intravenously at three-day intervals, resulted in cure.

H. H. S.

TALICE (R. V.). Sur la filamentisation des *Monilia*. [**Formation of Hyphae in Monilia.**]—*Ann. Parasit. Humaine et Comparée*. 1930. July 1. Vol. 8. No. 3-4. pp. 394-410. [35 refs.] [Parasit. Lab., Faculty of Med., Paris.]

Monilias are commonly "dimorphic" in the sense that they may grow in a yeast-like, blastosporous, form or, under certain conditions, may develop hyphae. This phenomenon was investigated in 30 strains of *Monilia* isolated from the mouth, sputum or faeces of healthy or unhealthy human subjects, and from hedgehogs.

The tendency of these fungi is to develop in the blastosporous form, and repeated culture in this form may give rise to a race of *Monilia* entirely yeast-like, or nearly so. The hyphal form is essentially a young one and is found in early cultures on nearly all media. Development of hyphae is favoured by adverse conditions of growth, including reduced oxygen tension and poor nutritive media which, however, contain both proteins and carbohydrates. A less important factor is liquid media, the most suitable being potato-water medium containing 2-3 per cent. of grated potato. A temperature of 37° C. is the optimum for hyphal formation and is sometimes essential for it.

P. T.

LIM (C. E.) & KUROTCHKIN (T. J.). **The Action of Certain Dyes and Drugs upon Pathogenic *Monilia tropicalis*.**—*Nat. Med. J. China*. 1930. Apr.-June. Vol. 16. No. 2/3. pp. 215-222. [9 refs.] [Peiping Union Med. College, Peking.]

These experiments, made in the Division of Bacteriology, led the authors to the following conclusions:—

"1. Several substances have been tested for their fungistatic and fungicidal power against *Monilia tropicalis* and it was found that although the fungistatic property of gentian-violet and brilliant green was high, the fungicidal power of both dyes was of no practical significance.

"2. The fungistatic and fungicidal properties of other drugs, as mercurochrome, acriflavine, rivanol and neo-salvarsan were, in general, too low to suggest the possibility of the therapeutic application of these substances.

"3. It was also found that the intravenous injections of gentian-violet, mercurochrome, acriflavine, rivanol, neo-salvarsan and immune anti-monilia serum could not prevent the development of a fatal mycotic septicaemia in rabbits experimentally infected with *Monilia tropicalis*" [isolated from the sputum in a fatal human lung infection].

A. G. B.

KUROTCHKIN (T. J.) & LIM (C. E.). **The Effect of Animal Passage upon Pathogenic Monilia.**—*Nat. Med. J. China*. 1930. Aug. Vol. 16. No. 4. pp. 332–337. With 4 figs. on 2 plates. [5 refs.] [Peiping Union Med. College, Peking.]

The experiments were carried out with a strain of *Monilia* isolated from a fatal case of bronchomoniliasis. Cultures were grown on Sabouraud's maltose agar at 37° C. for 24–36 hours, and hamsters (*Cricetulus griseus*) were used as test animals. When newly isolated an injection of 18 million monilia cells was required to kill hamsters in 48 hours. After being cultivated on Sabouraud's medium for 3 months the minimum lethal dose increased to 270 million monilia cells. After passage through 30 hamsters the minimum lethal dose decreased to 10 million cells. Inoculation of very large doses resulted in death in 24–36 hours from mycotic septicaemia; inoculation of moderate doses caused death in 3 days from mycotic pyaemia.

P. T.

HOFFSTADT (Rachel E.) & LINGENFELTER (John S.). **A Pulmonary Infection caused by *Monilia balcanica* (Castellani).**—*Amer. J. Trop. Med.* 1929. Nov. Vol. 9 No. 6. pp. 461–469. With 4 figs. [7 refs.] [Dept. of Bact. & Path., Univ., Washington, & Polyclinic, Seattle, Washington.]

An atypical strain of "*Monilia balcanica* Castellani" [presumably *Monilia balcanica* Castellani, but the spelling of the authority is given variously as Castellini, Castellani and Gastallani in the text, and *balcanica* is spelled *balconica* throughout] was isolated from the sputum of a patient with a pulmonary infection. *M. balcanica* has been found by CASTELLANI in digestive cases in the tropics, but has not previously been isolated from a case of pulmonary infection. Intraperitoneal and intrapleural inoculation of guineapigs with broth cultures resulted in abscesses at the point of inoculation and marked congestion of the lungs. Complement fixation reactions were obtained in the patient and in a rabbit which had been inoculated intravenously with cultures. Agglutination tests failed.

P. T.

PANAYOTATOU (Angelica). **A Case of Castellani's Broncho-Moniliasis with *Monilia alexandrina* as the Aetiological Agent.**—*J. Trop. Med. & Hyg.* 1930. Jan. 15. Vol. 33. No. 2. pp. 17–18. [2 refs.]

A case of bronchomoniliasis is reported which clinically resembled pulmonary tuberculosis and is peculiar in that the causative organism appears to have been a *Monilia* of the *zeylanica* type. It differs from *M. zeylanica*

in having white cultures, and the author describes it as a new species under the name *Monilia alessandrina*. Treatment, mostly with potassium iodide, was successful.

P. T.

WHEELON (Homer) & HOFFSTADT (Rachel E.). **Bronchomoniliasis caused by *Monilia Metalondinensis*.**—*Jl. Lab. & Clin. Med.* 1929. Nov. Vol. 15. No. 2. pp. 122-124. With 1 text fig. [4 refs.]

Cultures of *Monilia metalondinensis* Castellani were obtained from the sputum of a patient whose condition had been diagnosed as acute general respiratory infection of an influenzal type. The condition improved under symptomatic treatment. Animal inoculation with cultures was negative.

P. T.

i. NORRIE (F. H. B.). **Rhinosporidium Infection of the Nose, with a Report of Five Cases.**—*Jl. Laryngol. & Otol.* 1929. Aug. Vol. 44. No. 8. pp. 505-513. [6 refs.]

ii. CHERIAN (P. V.) & VASUDEVAN (A.). **A Case of Rhinosporidiosis in the Female.**—*Ibid.* pp. 518-519. With 2 plates (1 coloured).

i. The author has been on the look-out for *Rhinosporidium* since 1922, but though 9,622 cases have been seen in the ear, throat and nose department of an outdoor general dispensary at Calcutta in that period, only 5 cases of rhinosporidiosis have been diagnosed, i.e., about 1 in 1,924 cases. Four were in males, one in a female; all cases reported hitherto have been in males. The chief symptoms were nasal obstruction and watery discharge from the nose; no purulent discharge or oozing of blood. Examination of the secretion showed the characteristic spores, which may be stained with Leishman. The anterior part of the nose would appear to be the favourite site; the tumours arise in the mucous membrane, and the appearance is distinctive. Treatment is by dissection and is usually satisfactory. In one patient, however, the duration was 16 years and several operations had been done.

ii. A case described from Malabar with a good coloured illustration of the tumour in situ and (less good) of the microscopical appearances. [The first author gives references but not of ASHWORTH's chief paper (*Trans. Roy. Soc. Edinb.*, 1923, Vol. 53, Part 2, p. 301).]

A. G. B.

PARODI (Silvio). La rinosporidiosis en Sudamerica. [**Rhinosporidiosis in South America.**]—*Medicina Países Cálidos*. Madrid. 1930. Jan. Vol. 3. No. 1. pp. 55-62. With 3 text figs.

Recorded cases of this condition are very few. The author mentions the cases of SEEBER and MALBRÁN, and now adds two more, a young man of 19 years and a boy of 12 years, both from the neighbourhood of Buenos Aires. Microphotographs are reproduced showing the tissue changes and the parasite. He notes that in Uruguay LASNIER had one human case (not published) and in Paraguay two were described by MIGONE. All were males and all field-labourers.

H. H. S.

PEREIRA, Jr. [In Portuguese & English.] Culturas da *Piedra brasileira* (*Piedraia sarmentoi* n. sp.). **On the Cultures of Brazilian Piedra** (*Piedraia sarmentoi* n. sp.).—*Rev. Med.-Cirurg. do Brasil*. 1930. Feb. Vol. 38. No. 2. In Portuguese pp. 49–50. In English pp. 51–52. With 6 plates (1 map).

— Cultures de "Piedra" brésilienne: *Piedraia sarmentoi* n. sp.—*C.R. Soc. Biol.* 1930. June 20. Vol. 104. No. 21. pp. 680–682.

The nodules on the hairs in cases of Brazilian piedra are formed of a mosaic of double-contoured cells surrounded by hyphae; and in the more developed nodules Horta's cysts with vermiform spores [asci and ascospores according to LANGERON's interpretation] are present. Two fungi were grown from nodules, one of which is similar to *Trichosporum beigeli*, while the other appears to be a new species of the genus *Piedraia* recently founded by DA FONSECA and LEAO. It differs from *P. hortai* in the following characters:—Rapid growth on Sabouraud's medium; colour white at first, becoming black and fuliginous with age; cultures easily detachable from medium; on potato growth is slow and scanty and pigment development is delayed. The name *Piedraia sarmentoi* n. sp. is proposed for it. P. T.

PANAYOTATOU (Angélique). Sur les mycoses en Egypte. Amygdalites mycosiques à Alexandrie (d'Egypte). [**Mycotic Tonsillitis in Alexandria, Egypt.**].—*Rev. Méd. et Hyg. Trop.* 1929. Nov.–Dec. Vol. 21. No. 6. pp. 184–187.

Four cases of tonsillitis were observed in which the bacillus of Loeffler was not present, but fungous elements were plentiful. *Monilia metalondinensis* Castellani was cultivated from two of the cases and *Monilia tropicalis* Castellani from the other two. Treatment with alkaline washes and gargles, and with phenolized glycerine and glycerine with tincture of iodine was rapidly curative. P. T.

CASTELLANI (Aldo). **Fungal Diseases of the Tonsils (Tonsillomycoses).**—*Jl. Trop. Med. & Hyg.* 1930. June 16. Vol. 33. No. 12. pp. 165–180. With 31 text figs. [11 refs.]

Mycoses of the tonsils, which it is claimed are not rare, are clinically divided into acute tonsillomycoses and chronic tonsillomycoses. Acute tonsillomycoses are mostly due to yeast-like fungi of the genus *Monilia*, but sometimes are caused by species of *Cryptococcus*, *Endomyces*, *Saccharomyces* and other genera. Chronic tonsillomycoses may be caused by fungi of the genera *Actinomyces*, *Cohnistreptothrix*, *Hemisporea* and *Oidium*. In all cases the prognosis is generally favourable; and treatment mainly consists of dilute tincture of iodine locally and, in chronic cases, potassium iodide internally. P. T.

CASTELLANI (Aldo). **Urethromycoses of the Male, and Vulvovagino-mycoses.**—*Jl. Trop. Med. & Hyg.* 1929. Dec. 16. Vol. 32. No. 24. pp. 357–358. [5 refs.]

Various fungi have been observed in, and cultivated from, discharges present in cases of urethritis and vaginitis. The discharges may be whitish, red or black, and in some cases the colour is due to the presence of pigment-producing bacteria. P. T.

WEISS (Pedro). Sur un *Sterigmatocystis* agent d'une dermatose semblable au pityriasis versicolor flava: *S. cinnamominus* n. sp. [**On *Sterigmatocystis cinnamominus* n. sp. causing a Dermatitis resembling Pityriasis versicolor flava.**]*—Ann. Parasit. Humaine et Comparée.* 1930. Mar. 1. Vol. 8. No. 2. pp. 189-193. With 1 text fig. [4 refs.]

The patient, who had always lived in Peru, for several years had patches resembling pityriasis versicolor flava, chiefly on his neck and chest. Hyphae and spores were present in scales from the patches and, when inoculated on Sabouraud's media, gave cultures of a fungus, which is regarded as a new species and is named *Sterigmatocystis cinnamominus*.

The optimum temperature is 30°-37° C., and growth is at first white and downy and later becomes cream in the centre. The cream colour gradually spreads all over the colony and becomes darker until it may assume a chocolate shade. Conidiophores are simple, 5 microns thick, and terminate in globose heads 12 × 9 microns, bearing sterigmata 4 microns long, each of which bears 2-4 secondary sterigmata 5-6 microns long, from which arise chains of conidia 1-2 microns in diameter and brown in colour. A peculiar character is that hyphae give rise to large numbers of external lateral spores, which are spherical, 3-4 microns in diameter, and may be borne directly on the hyphae or on sterigmata. White downy pleomorphic tufts appeared on the surface of old cultures, and, when separated, grew as clear cream coloured colonies in which conidiophores were formed but never bore conidia and only developed monstrous sterigmata.

Inoculation of a woman with mycelium from third subcultures was positive after 15 days and microscopically scales from the lesions resembled those from the original case.

Cultures were pathogenic to rabbits by scarification (2 inoculated of which 1 died); and spores were pathogenic by subcutaneous inoculation to a rabbit.

P. T.

SARTORY (A.), MEYER (M.) & MEYER (J.). Contribution à l'étude des mycoses osseuses: trois cas d'ostéites dues d'une part à l'*Actinomyces asteroides* (Eppinger) et d'autre part à l'*Hemispora stellata* (Vuillemin). [**Three Cases of Mycotic Ostitis.**]*—Ann. Inst. Pasteur.* 1930. Mar. Vol. 44. No. 3. pp. 298-329. With 8 text figs. [10 refs.]

Three cases of ostitis are described in detail. They were first considered to be tuberculous, but fungi were isolated from the lesions and it appears that they were the causal organisms. In the first case the clinical and radiographic features of the lesions were characteristic, the latter differing markedly from the radiographic picture in tuberculous bone lesions. Operation and treatment with iodides was curative. From this case *Actinomyces asteroides* (var. *serratus*) was isolated. Cultures were pathogenic to guineapigs, and, when inoculated into the tibia of a dog, caused a progressive ostitis for 5 weeks, followed by gradual regression and, ultimately, spontaneous cure.

The causal fungus in the two other cases was *Hemispora stellata*, with cultures of which mycotic ostitis was experimentally reproduced in dogs. Operation and dressing the lesions with iodoform-glycerine and internal treatment with sodium iodide resulted in cure.

P. T.

PEREIRA, Jr. [In Portuguese & English.] *Sporotrichum fonseci* e o diagnostico diferencial dos esporotrichados. (2a nota prévia.) *Sporotrichum fonseci* and the Differential Diagnosis of the Sporotrichales.—*Rev. Med.-Cirurg. do Brasil*. 1930. May. Vol. 38. No. 5. In Portuguese pp. 163-170. In English pp. 170-174. With 84 figs. on 24 plates.

From lesions on the nose of a girl aged 12 years a new species of *Rhinocladium* was isolated, which is named *Rhinocladium fonseci*, and of which the morphology and cultural characters are described. Cultures are pathogenic for white mice and rats. Treatment with potassium iodide led to a complete cure in about six weeks.

P. T.

SCOTT (Ernest L.) & MCKINLEY (Earl B.). **Effect of Ultraviolet Light upon Genus *Trichophyton***.—*Proc. Soc. Experim. Biol. & Med.* 1930. Mar. Vol. 27. No. 6. pp. 598-599. [School of Trop. Med., Univ. of Porto Rico, San Juan, & College of Physicians & Surgeons, New York.]

A culture of *Trichophyton asteroides* was ground up in physiological saline solution and exposed to ultraviolet light in quartz tubes. The source of light was an alpine sun lamp, and the tubes were placed at a distance of one foot from the lamp. Exposure to the light of 5 to 20 minutes' duration killed the fungus.

P. T.

ASHFORD (Bailey K.), MCKINLEY (Earl B.) & DOWLING (George B.). **Experimental Inoculation of Monkeys (*Silenus rhesus*) and Guinea Pigs with Two Dermatophytes and One Blastomycoides**.—*Porto Rico J. of Public Health & Trop. Med.* 1930. June. Vol. 5. No. 4. pp. 452-457. With 2 figs. on 1 plate. [9 refs.] [School of Trop. Med., Univ. of Porto Rico, San Juan.]

Monkeys and guineapigs were successfully inoculated with *Trichophyton asteroides* by abrading the shaved skin of the abdomen with sandpaper and rubbing 1 cc. of an emulsion of *T. asteroides* into the scarified area. The presence of the fungus in the experimental lesions was confirmed by direct examination of the scales and by culture. Hypodermic and subcutaneous inoculation failed to produce infection in monkeys.

The same technique was used in inoculating *Sabouraudites rubrum* and *Blastomycoides aurea* to monkeys, with negative results in the former case, and with doubtful success in the latter.

P. T.

PEÑA (Raul). [In Portuguese & English.] A proposito de um caso de mycetoma podal de grãos brancos observado em Asunción, proluído pelo *Scedosporium apiospermum*. On a Case of Foot Mycetoma, with White Grains, observed in Asunción and produced by "*Scedosporium apiospermum*."—*Rev. Med.-Cirurg. do Brasil*. 1930. Apr. Vol. 38. No. 4. In Portuguese pp. 142-145. With 1 text fig. In English pp. 145-147. [Oswaldo Cruz Inst., Rio de Janeiro.]

— A propos d'un cas de mycétome à grains blancs observé à Assomption (Paraguay) et produit par le *Scedosporium apiospermum*.—*C.R. Soc. Biol.* 1930. June 20. Vol. 104. No. 21. pp. 689-690. [Oswaldo Cruz Inst., Rio de Janeiro.]

Cultures of the fungus obtained by DELAMARE and GATTI from a case of mycetoma with white grains [see this *Bulletin*, Vol. 27, p. 522] were studied on various media. As a result of this investigation the fungus is identified as *Scedosporium apiospermum* Saccardo 1911.

P. T.

REVIEWS AND NOTICES.

PEARCE (Louise) [M.D.]. **The Treatment of Human Trypanosomiasis with Tryparsamide. A Critical Review.**—*Monographs of the Rockefeller Inst. for Med. Research.* New York. 1930. Aug. 15. No. 23. 339 pp.

In her introduction the author points out that eight years have now elapsed since the institution in the Belgian Congo of the tryparsamide treatment of sleeping sickness. In the intervening years the use of the drug has constantly increased throughout Tropical Africa and there has accumulated a considerable literature on the subject.

The object of the present monograph is to subject to critical analysis the available records of cases which bear on tryparsamide therapy of African sleeping sickness. The total number of cases considered is 1,848, the majority of which were in an advanced stage of the disease. The author writes that it is certain that a drug adapted to general use in African sleeping sickness must possess properties of biological action which render it applicable to the treatment of patients in the advanced as well as the early stage of the infection. Furthermore, the incidence and distribution of the disease impose the necessity of large scale administration under field conditions. In the present review the drug is considered from both these important points of view.

The first three chapters deal with biological considerations ; the source, materials and methods of the present analysis , and administration and dosage. Chapter IV relates to complications of drug administration. The author points out that the use of tryparsamide in human trypanosomiasis has been singularly free from untoward effects other than visual complications of a low incidence and usually of a transitory character. While the possibility of amblyopia should be fully recognized, it may be stated at once that its occasional occurrence is not a deterrent to the use of the drug. The condition has occurred practically only in the second stage of the disease, and then generally in very advanced cases. As a rule, if the drug is discontinued on the appearance of the first symptoms, e.g., diminished visual acuity, recovery takes place, but in certain instances the condition becomes more pronounced and a permanent disability may result which may be as serious as complete blindness. After summarizing the literature bearing on this subject, Pearce states that it is generally agreed that with advanced cases in particular visual complications may be largely avoided by employing a system of small or medium sized doses or of greater doses given at intervals of not oftener than once a week. VAN DEN BRANDEN advocated doses of 2 gm., whilst KELLERSBERGER gives 2 and 3 gm. doses. CHESTERMAN is of opinion that doses of 4 gm. and LAIGRET that doses of 3 gm. should not be exceeded. It is now generally agreed that the method of graduated doses, especially in very advanced cases, greatly reduces the chances of amblyopia. The whole question of amblyopia is discussed in the detail which so important a subject demands.

Chapter V discusses the therapeutic results obtained in early cases of *gambiense* infection, and Chapter VI the results in advanced cases of *gambiense* infection in the Belgian Congo. The next two chapters are devoted to the therapeutic results in advanced cases of *T. gambiense* infection in the Cameroons and in French Equatorial Africa respectively.

In Chapter IX the author considers the cause of failures in *T. gambiense* infections. She remarks that the number of definite failures is small considering the advanced character of the disease in a large number of cases. The instances of death were practically all in very advanced or moribund patients. The blood relapses of the cases in which the cell

content of the spinal fluid was little affected were, for the most part, examples of a less advanced infection. The dosage administered in the failures was, in general, insufficient. Many cases received much less than 25 or 30 gm. and treatment was irregular in a number of instances. The time at which failures were observed is interesting. In the majority of cases it occurred within six months of the termination of treatment. At the end of this chapter, the author writes as follows :—

‘ The analyses of failures embodied in this chapter emphasize three important aspects of tryparsamide therapy of advanced cases. Peripheral relapses have been observed, although rarely, in this stage of the infection. Blood examinations are, therefore, theoretically essential as a control of the results of treatments. In the second place, the appropriate method of treating very advanced patients appears to be one of graduated doses, and it is highly essential that a sufficient amount be given before treatment is interrupted. It is probable that the first course should consist of not less than 25 to 35 gm. To obtain the best results, moreover, the injections should be given regularly. Finally, it should be pointed out that the proportion of satisfactory results in advanced cases of infants and children has been definitely lower than in adults. The dosage administered was comparable to that given adult patients. Certain authors have drawn attention to the fact that the disease in young individuals is apt to be unusually severe and rapid, and these observations, together with the evidence furnished by the present discussion, indicate that the infection in children is more difficult to influence than that of adults. In view of Chesterman’s findings, however, that children tolerate approximately twice the adult dose of tryparsamide per unit of body weight, it will be necessary to await the results obtained by a higher dosage before an evaluation of the treatment of this class of patients can be made.”

Chapter XI deals with the results obtained with *T. rhodesiense* infection. Unfortunately, the information available is comparatively limited. It seems clear, however, that, as far as the blood stream infection is concerned, the action of the drug administered in 2 and 3 gm. doses at weekly intervals is relatively insignificant. Most observers are of opinion that tryparsamide has a place in the therapy of *rhodesiense* infection, but that it should be administered subsequent to initial treatment with Bayer 205. [As the author points out, however, this method has been tried in too few cases to permit of sound judgment.]

The last chapter consists of a general discussion of the reports concerning the use of tryparsamide in the therapy of human trypanosomiasis. In an appendix details of the results of treatment of a large number of cases are given in tabular form.

The report, which has evidently entailed an enormous amount of work, should prove of great value to those engaged in the treatment of human trypanosomiasis.

W. Yorke.

MANTEUFEL (P.) & TAUTE (M.). **Trypanosen des Menschen.** [Human Trypanosomiasis.]—*Handbuch der pathogenen Mikroorganismen.* [Kolle u. Wassermann.] 1930. Band 7. Lfg. 46. pp. 1139–1310. With 51 text figs. & 2 coloured plates.

This article is a thoroughly good and up-to-date account of human trypanosomiasis in all its aspects. In general arrangement that of previous editions of the “Handbuch” is followed but it is evident that each section has been carefully revised so that nothing of importance has been omitted. This being the case it would seem unnecessary in a review to do more than

recommend the article to all those who can read German and who wish to obtain a good general knowledge of the subject. Nevertheless a few points may be noted. The recent work of the League of Nations Commission, particularly with reference to the pathology of the African disease and the vexed question of the relationship of *Trypanosoma rhodesiense* to *T. brucei* and that of both of these to *T. gambiense*, is carefully described. As regards this relationship, though the authors incline to the view favoured by KLEINE that *T. rhodesiense* is merely *T. gambiense* which has been introduced into a hitherto unexposed population and that the former is distinct from *T. brucei*, the claims of other investigators who disagree are not ignored. The work which has shown that trypanosomiasis has a profound influence on sugar metabolism in the body is described, as also the results of investigations on the adhesion or Rieckenberg phenomenon. On the subject of treatment the place of trypanasamide and germanin (Bayer 205) is clearly defined and no unwarranted claims are made for the superiority of the latter over other remedies. On the subject of prophylaxis the relative merits of removal of population from infected areas, described as the English method, active anti-fly campaigns in the vicinity of human habitations, styled the German method, and the employment of drugs to cure or prevent infections are discussed. Twenty-four of the 154 pages of the article are devoted to South American human trypanosomiasis. Again the account is an excellent one, much attention being paid to the more recent experiences of the disease in the Argentine which have tended to modify views regarding symptomatology. It seems very doubtful if cretinism and myxoedema are caused by the trypanosome as CHAGAS had originally supposed. These are but a few illustrations of the thoroughness with which the authors have revised the original article. The present one is undoubtedly the best general account of these two diseases of Africa and South America. It has a sufficiency of good text figures, two coloured plates of the insect vectors and in addition eighteen pages of the more important references.

C. M. Wenyon.

LYNCH (Kenneth M.) [M.D., Professor of Pathology, Medical College of the State of South Carolina, Charleston, South Carolina]. **Protozoan Parasitism of the Alimentary Tract. Pathology, Diagnosis and Treatment.**—pp. xvii+258. With 37 text figs. 1930. New York: The Macmillan Company. [16s.]

So many books have appeared in recent years in which the intestinal protozoa of man have been fully dealt with that at first sight there would seem to be no necessity for another. Yet this little book fills a gap left by the others, for it is written especially for the medical practitioner and those who work in clinical laboratories. It serves as a guide to the subject in that it explains sufficiently clearly without unnecessary detail the structure, life-history and habits of these organisms and at the same time warns its readers against the acceptance of unestablished views. Those who read the book will have a clear conception of the relation of the intestinal protozoa to the host and will not be led astray by enthusiasts who think the mere presence of a protozoon in the alimentary canal affords an explanation of whatever disease the patient is suffering from and is an indication for some drastic line of treatment. The advice given is sound and is based on many years' experience of the difficulties of diagnosis, of the mistakes which are frequently made, and of the futility of condemning patients to courses of treatment to eradicate infections which have never been proved to be anything but harmless. Full attention is given to the methods of transmission of these parasites and the part played by animals as possible reservoirs. The question whether *Entamoeba histolytica* is an obligatory parasite of the intestinal wall or whether it may sometimes confine itself in a harmless capacity to the lumen of the bowel is carefully

discussed, as also that of the possibility of the encysted form excysting in the host without leaving the body. On both these questions, as on many others for which there is insufficient evidence to give a definite answer, the author very rightly keeps an open mind. The various treatments recommended are up to date, all due consideration being given to emetine, yatren and stovarsol and the dangers connected with their administration. The book is undoubtedly a useful one and with its admirable tone of moderation should do much to promote a clear understanding of the part played by intestinal protozoa in the causation of disease in man.

C. M. Wenyon.

CASTELLANI (Aldo) [K.C.M.G., D.S.C., M.D., F.R.C.P., Director of Tropical Medicine, Ross Institute, etc.]. **Climate and Acclimatization. Some Notes and Observations.**—pp. viii+152. With 6 figs. (4 maps). 1931. London: John Bale, Sons & Danielsson, Ltd., 83-91, Great Titchfield Street, W.1. [7s. 6d.] [Review appears also in *Bulletin of Hygiene*.]

"Climate and Acclimatization" is not a book that can be reviewed by merely reading the preface and glancing through the text, for when once opened it will hold the reader from cover to cover.

The book is divided into three chapters entitled "Climate," "Effects of Climate" and "Pressure." There are several good diagrams and at the end a most valuable list of references has been compiled. After classifying climates in a tabulated form the author goes on to show the effect of each on man, animals and vegetation, and an interesting map illustrates their relationship to the output of human energy.

The second chapter is perhaps the most interesting in the book and in it the effect of climate on the various systems of the body is carefully and systematically analysed and reference is made to past and recent work on this subject. When dealing with the heat regulation of the body the importance of the part played by the evaporation of invisible sweat rather than that of the water secreted is strongly emphasized. The various means of investigating the body temperature are described and the fallacy of placing a thermometer for half a minute in a perspiring axilla is pointed out, though the author states that in a dry and well-closed axilla the temperature will nearly always approach that of the mouth. A note of warning is sounded on the dangers of constipation in tropical climates with a low humidity and the necessity of a daily intake of water to combat the loss of moisture from the skin is stressed.

When speaking of the effects of climate on the nervous system, "tropical irritability," a syndrome sometimes found among senior members of the fighting services, is discussed, and while one associates this with hot climates it is interesting to note that a similar condition even approaching "tropical fury" is often found in cold and mountainous countries where the air is surcharged with electricity. This section of the book ends with an excellent description of the pathological conditions caused by high atmospheric temperature and humidity exemplified by heat stroke and heat exhaustion. A résumé of the experimental work on the causation of heat stroke is first given, after which its aetiology, symptomatology and treatment are discussed, while heat exhaustion is dealt with clearly and concisely.

The last chapter deals with pressure, the causation of wind, and acclimatization, and finishes with some very useful advice for those about to live in the tropics.

In "Climate and Acclimatization" Sir Aldo Castellani has produced a book which is not only of real scientific value but one which, on account of its clarity and simplicity of style, will be found most interesting by the layman.

G. S. Parkinson.

WOLTER (Friedrich). **Die Malaria in Russland in ihrer Abhängigkeit von Boden und Klima. Ein epidemiologischen Kommentar zu dem der Malaria-Kommission des Völkerbundes im Jahre 1924 erstatteten Bericht von Dr. I. A. Dobritzner: "Le paludisme en Russie de Sovjets."** [Malaria in Russia: Its Dependence on Soil and Climate.]—*Pettenkofer-Gedenkschrift*. 1930. Vol. 11. 56 pp. With 1 coloured plate. [5 refs.] Munich: J. F. Lehmann.

The author, an enthusiastic disciple of PETTENKOFER, considers that the history of malaria in Russia since the war signally illustrates the truth of PETTENKOFER's fundamental doctrine of the importance of a soil factor. Briefly, the doctrine is this: that putrefactive changes in the soil are an essential factor of the epidemicity of various diseases, particularly cholera, the typhoid group, malaria. A declining level of the sub-soil water will be an *index* of this (as PETTENKOFER himself said—"Looked at by itself and for its own sake, the condition of the sub-soil water has as little significance as the hands and dial of a watch dissociated in thought from the works to which they belong"). When this condition is fulfilled and at the same time the general drainage and cultivation of the soil are neglected, epidemics will be generated. The author, taking the data provided by DOBRITZNER, shows a correlation in time between increasing or decreasing malaria prevalence in Russia and falling or rising level of the sub-soil water. He accounts for the enormous increase between 1921 and 1925, during a period of falling sub-soil water, by the breakdown of organization and consequent neglect of soil culture and drainage consequent upon the civil wars. He considers that the contrasting experiences of the French and the Americans in Panama are best explained in terms of PETTENKOFER's doctrine. The French period of failure corresponded to an epoch of falling sub-soil water. The Americans were not only active in a more favourable period but, over and above specific anti-malarial measures, systematically carried out drainage operations. He points out that pneumonia, dysentery and typhoid declined under their régime as dramatically as malaria. An examination of the history of malaria in Italy and the Ems lowlands leads him to the same conclusion.

[Although there is some exaggeration and a rather light-hearted acceptance of what seem to the abstractor very sketchy statistical data—the table on pp. 21–22 may be instanced—in this monograph, it is a serious contribution to its subject. A point of view is presented which is worthy of consideration.]

M. Greenwood.

BUREAU OF HYGIENE AND TROPICAL DISEASES.

TROPICAL DISEASES BULLETIN.

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[No 6

CHOLERA.

LEAGUE OF NATIONS MONTHLY EPIDEMIOLOGICAL REPORT. 1930. June 15. Vol. 9. No. 6. pp. 242-251. With 3 maps & 4 diagrams. [In parallel French & English.] **Cholera in 1929-30.**

This bilingual Report is said to deal with Cholera in 1929-30; but it also contains tables of statistics, some from 1921 to 1930, and others from 1926 to 1930. It is stated that cholera has been confined to Asia since 1922, where it has occurred in endemic or epidemic form, particularly in India, Siam, Indo-China and China. It is further recorded that the Mecca pilgrimage has been free from cholera since 1913 owing to the rigorous measures taken against its introduction and spread.

J. H. Tull Walsh.

GRAHAM (J. D.). Etudes sur le choléra dans l'Inde Britannique en 1929-1930. [**Cholera in British India in 1929-1930.**—*Bull. Office Internat. d'Hyg. Publique*. 1930. Oct. Vol. 22. No. 10. pp. 1874-1878. With 1 text fig. [3 refs.]

This memoir sums up, as in previous years, the investigations which have been carried on in various provinces of India. Very definite expressions of opinion are put forward by the workers in the United Provinces that each new epidemic is always due to importation of a case of cholera and that endemic foci do not exist there. Examination of stools of individuals belonging to apparently endemic areas have never furnished a single carrier. There is, in fact, no evidence for the existence of chronic carriers. An epidemic takes origin through the instrumentality of a case of cholera, to a less extent of a convalescent from cholera and to a still less extent of an individual in the incubation period of the disease. Non-agglutinating vibrios have nothing to do with epidemic cholera.

Investigators in Bihar and Orissa have taken a different course. An examination of 1,479 samples of stools for carriers gave 36 positive individuals with agglutinating vibrios, all of whom were direct contacts of cholera cases. Agglutinating vibrios were isolated from the stools of 3 persons who had not been in contact with epidemic cholera. As in previous years, an increase in the content of vibrios was found to take place in surface reservoirs during the hot dry months and a certain diminution with the onset of the monsoon. All the agglutinating vibrios and most of the non-agglutinating vibrios resembling the former have given the nitroso-indole reaction.

W. F. Harvey.

FALÇÃO (Edgard de Cerqueira). A cholera asiatica e a emigração japoneza para o Brasil. [**Cholera in Relation to Japanese Emigration to Brazil.**].—*Bol. Oficina Sanitaria Panamericana*. 1930. June. Vol. 9. No. 6. pp. 757-761. [2 refs.]

It has been established that the passage of cholera vibrios by carriers is always temporary, a matter of 2 weeks on the average and in exceptional cases of 7 weeks. The problem here considered is that of the quarantine regulations to be imposed by a cholera-free port in Brazil on emigrants from Japanese ports. The efficiency of the Japanese sanitary arrangements is unquestioned and yet in spite of strict rules requiring repeated faecal examinations of contacts and preventive vaccination on a large scale, carriers have been taken on board and epidemics have arisen on outgoing ships. Although the probabilities of introduction of cases from Japan are small, considering the two months' voyage and the precautions taken, still the author thinks the proposal, to detain individuals proceeding from places where cholera is prevalent and to suspend emigration from an infected port for two months after complete cessation of cases, is justified.

W. F. Harvey.

MCDOWALL (R. J. S.). On the Use of Common Compounds of Carbon in Disease, with Special Reference to Cholera.—*Edinburgh Med. Jl.* 1930. Aug. Vol. 37. No. 8. pp. 463-482. [51 refs.] [King's College, Univ., London.]

This paper is the Parkin Prize Essay of the Royal College of Physicians of Edinburgh for 1930. After some remarks on the early discovered facts concerning CO₂ the author says that they overshadowed the subsequent use of carbon dioxide as a possible therapeutic agent. To J. S. HALDANE we owe the full appreciation of CO₂ as the great stimulant of respiration. The author fully discusses that question and deals also with the relations of carbon dioxide to the circulation and to the defences of the body. In cholera the importance of the fully functioning vasomotor centre is apparent, since the excessive diarrhoea reduces the amount of fluid in the body and the blood becomes so concentrated and reduced in amount that the blood pressure may fall to a dangerous extent. Evidence has been put forward that not only is recovery of the blood pressure after an injection of histamine due to activity of the vasomotor centre, but that the response is profoundly affected by carbon dioxide. The relationships of CO₂ to adrenaline are considered. The use of carbon dioxide and adrenaline stimulates the sympathetic and inhibits the activity of the bowel. For a similar reason in cholera ROGERS advocates the administration of atropine, another carbon compound, night and morning. The author describes the use of sodium bicarbonate and gum arabic in cholera [see this *Bulletin*, Vol. 14, p. 183 (BAYLISS); Vol. 15, p. 77 (ROGERS, BAYLISS) and p. 78 (MOORE)]. Glucose is also advocated for intravenous injection. Alcohol in reasonable quantities offers a method of supplying energy when the absorptive powers of the individual are low.

J. H. T. W.

TOMB (J. Walker). **The Differential Diagnosis of Cholera and Food Poisoning.**—*Indian Med. Gaz.* 1930. Sept. Vol. 65. No. 9. pp. 494-496. [6 refs.]

The author states that fatal cases of cholera among Europeans in India are often attributed to "ptomaine poisoning" notwithstanding the fact that no bacteriologically attested outbreak of food infection has been recorded in India. The term "ptomaine poisoning" is a misnomer and should be discarded. The word *ptomaine*, from *ptoma*, a corpse, was coined in 1870 to describe the products of protein decomposition. Some of these, though by no means all of them, when injected parenterally into laboratory animals were found to be poisonous. Subsequent research showed that none of them were actively poisonous when taken by the mouth, and that even those that were active did not produce intestinal colic, vomiting and diarrhoea. The term "food poisoning" or "food infection" should be substituted. The organisms responsible for "food infection" have been shown to belong to the *Salmonella* group and include *Bact. enteritidis* (Gaertner) and *Bact. aertrycke*. The differential diagnosis of cholera and food infection is given in tabular form:—

Symptoms.	Cholera.	Food Poisoning.
Diarrhoea ...	Painless. Precedes vomiting.	Associated with severe intestinal pain. Generally follows vomiting.
Vomiting ...	Causes no distress. Watery, copious and projectile. Follows diarrhoea.	Often violent and distressing. Vomit consists of food, and is never watery, copious or projectile. Generally precedes diarrhoea.
Nausea ...	Absent ...	Constant.
Retching ...	Rare ...	Constant, often severe.
Acute abdominal pain ...	Rare ...	Constant.
Tenesmus ...	Absent ...	Common.
Stools ...	"Rice-watery" and copious.	Liquid but faecal and offensive. Never colourless or copious.
Urine ...	Complete suppression.	Never suppressed.
Muscular cramps	Constant. The severity depending on the amount of fluid lost from the tissues.	Present only in very severe cases. Often associated with tingling and numbness. Mild and confined to the extremities.
Collapse ...	Frequent. Chiefly from loss of fluid.	Never from loss of fluid. In severe cases faintness or syncope may occur from toxæmia.
Fever ...	Surface temperature below normal.	Axillary temperature 99-102°F. Accompanied by shivering in severe cases.
Headache ...	Absent ...	Frequent.

J. H. T. W.

MUKHERJEE (Suresh Chandra). Intravenous Calcium Chloride in the Treatment of Cholera.—*Indian Med. Gaz.* 1930. Sept. Vol. 65. No. 9. pp. 498-499. [2 refs.]

Results with different forms of treatment of cholera in the collapse stage by the intravenous method are shown below:—

Period.	Treatment.	Cases.	Deaths.	Percentage of	
				Deaths.	Recoveries.
A. 1927, 1928, and first 2 months of 1929	Hypertonic saline, CaCl_2 gr. 4 to pint.	38	13	34.2	65.8
B. Last 10 months of 1929.	Hypertonic saline, CaCl_2 gr. 5 or 6 to pint.	28	5	17.8	82.2
C. First 20 days of 1930 epidemic.	Hypertonic saline, CaCl_2 gr. 5 or 6 to pint, with Sod. chloride gr. 105. Also Sod. bicarbonate gr. 160 to the pint separately.	18	4	22.2	77.8

The author considers "C" to be the best treatment for severe cases of cholera.

J. H. T. W.

HERMANT. Mesures de prévention et de suppression des épidémies de choléra. [**Prevention and Suppression of Cholera Epidemics.**]—*Ann. de Méd. et de Pharm. Colon* 1930. July-Aug.-Sept. Vol. 119. No. 3. pp. 362-377.

The author states that anti-cholera vaccination is not sufficient to protect against epidemics of cholera unaided by a powerful sanitary organization and points out that as yet no such organization has been established in Indo-China. He has drawn up a useful list of measures of prevention and another list of measures for the suppression of cholera epidemics. They contain nothing that is new.

J. H. T. W.

SARRAMON. Sur l'emploi préventif du vaccin anticholérique par voie buccale. [**Oral Administration of Anticholera Vaccine.**]—*Bull. Soc. Méd.-Chirurg. Indochine.* 1930. Feb. Vol. 8. No. 2. pp. 180-183.

The author is an enthusiastic supporter of the use of bilivaccine as a preventive of cholera. According to his data the villages where this vaccine was used gave an incidence of 0.36 per cent. for 4,982 treated and of 2.02 per cent. for 11,004 not treated. Very similar results were obtained with an inoculated vaccine, namely, 0.37 per cent. incidence for 8,485 treated and 1.67 per cent. for 29,254 not treated. Much the same result was also obtained in villages where the two methods of preventive treatment were employed side by side.

W. F. Harvey.

URBAIN (Achille). Les vaccinations anticholériques. [**Anticholera Vaccination.**].—*Rev. Prat. Malad. des Pays Chauds.* 1930. Sept. Year 9. Vol. 10. No. 9. pp. 397–402, 405. [1 ref.]

In this short review of the subject there is given an account of the evolution of cholera vaccine treatment, the various types of vaccines and those statistics which have been presented by originators and advocates of the different forms of treatment. Beginning with FERRAN and HAFFKINE, who used living vaccine, the author describes the introduction of a killed vaccine by GAMALEIA and recounts the several steps which have led to the sensitized vaccine, the bilivaccine and anti-virus, which are associated with the name of BESREDKA. The conclusions of the author are that the best vaccines contain young vibrios and are killed by heat, that orally administered bilivaccine requires confirmation of its value, and that cholera antiviral is still under trial in the laboratory.

W. F. Harvey.

RAJU (V. Govinda). **The Influence of Age and Temperature of Storage on the Strength of Cholera Vaccines.**—*Indian J. Med. Res.* 1930. Oct. Vol. 18. No. 2. pp. 527–532. [3 refs.] [Public Health Dept., Bengal.]

Carbolized cholera vaccine undergoes a steady diminution of its opacity from the day of preparation. An experiment carried out at room temperature showed that the average strength of 29 vaccines, as determined by the opacity test, was initially 49,000 millions per cc. and that this opacity strength, determined on the 1st, 2nd, 3rd, 4th, 6th, 14th, 21st and 28th days after preparation, was estimated at 29, 25, 19, 18, 16, 15, 13 and 12 thousand millions respectively. The universal use of the opacity estimation makes this observation a very real argument for standardization immediately after preparation, even when the preparation is on a large scale. Low temperature was found to delay somewhat the autolysis causing loss of opacity, while the action of light seemed to be altogether without any effect in either direction. Exposure to light, however, caused production of a brownish tinge in the vaccine.

W. F. Harvey.

ARNOLD (Lloyd) & SHAPIRO. **An Experimental Study of Host Susceptibility to Cholera.**—*Indian Med. Gaz.* 1930. Sept. Vol. 65. No. 9. pp. 496–498. [4 refs.] [Med. College, Univ. of Illinois, & Research Lab., Illinois Dept. of Public Health, Chicago.]

The object of this paper is to show that, in rabbits, host susceptibility to *V. cholerae* has been changed or modified by changing the reaction of the upper part of the intestinal tract:—

1. *V. cholerae* injected into the duodenum of rabbits in saline does not cause diarrhoea—such animals remain healthy.

2. *V. cholerae* injected into the duodenum in alkaline buffered phosphate solution causes diarrhoea and death.

3. One half of the minimal lethal dose of *V. cholerae* injected intravenously does not cause diarrhoea, nor does it do so if followed by an intraduodenal injection of saline.

4. The same dose intravenously, followed by intraduodenal injection of sterile alkaline buffered phosphate solution, causes diarrhoea and death. In 2 and 4 vibrios can be isolated from the intestinal tract and various organs after death.

J. H. T. W.

WATANABE (Yoshimasa). **The Type Determination of *Vibrio cholerae*.**—*Japan Med. World.* 1929. Dec. 15. Vol. 9. No. 12. pp. 367-374. [26 refs.] [Kitasato Inst. for Infect. Diseases, Tokyo.]

This article treats of the different types of cholera vibrio which have been isolated in Japan and of their title to be designated true cholera vibrios. The types receive the names of typical, atypical and intermediate, or are divided up numerically. In general epidemics the typical vibrio is usually the one obtained whilst atypical vibrios are isolated from sporadic cases. Controversy in Japan has proceeded on lines similar to that elsewhere. It is the controversy over the cholera and the cholera-like vibrios. Cholera is imported into Japan mainly from China and especially Shanghai.

W. F. Harvey.

DHAR (D. R.), DHAR (Hrishikesh) & ADHYEE (Purna Chandra). **The Role of Non-Protein Nitrogen Content of Blood in Cases of Cholera.**—*Calcutta Med. Jl.* 1930. July. Vol. 25. No. 1. pp. 1-10. [1 ref.]

In order to find out what relation post-choleraic uraemia had with the pathogenesis of cholera the non-protein nitrogen content of the blood was estimated in 66 cases of cholera picked out at random from several hundred cases in the wards. They showed a definite rise of N.P.N. in their blood and the incidence of post-choleraic uraemia symptoms was such a common experience that the authors conclude that every case of cholera is one of potential uraemia. Their experience has caused them to modify their treatment of cholera on a line in which free purgation is allowed to the last, either with Hydrarg. Subchlor., Castor oil or concentrated solutions of Mag. Sulph. and Sodii Sulph. The details of these methods and their results will form the subject of a subsequent paper.

J. H. T. W.

KHAN (Saranjam). **On the Vibriocidal Power of the Water of Certain Rivers of India.**—*Indian Jl. Med. Res.* 1930. Oct. Vol. 18. No. 2. pp. 361-365. [4 refs.]

Since the time of HANKIN's experiments (1896) it has been known, and confirmed by various workers, that *V. cholerae* dies rapidly in river water. Khan & AGARWAL found that in the Ganges and the Jumna river water the vibrio died out in almost 24 hours. In the same water, boiled, it lived on the average for about 3 days. It was thought desirable to investigate the cause of the vibriocidal power of the water of these rivers. If it be true in nature, as it may be in the laboratory, that waters which contain bacteriophage are inimical to the cholera vibrio (as was suggested by D'HERELLE) the fact is of practical importance. As the result of experiments the author found

that the water contained no bacteriophage nor could any vibriocidal substance be volatilized from the water. In raw water there are many organisms competing for food. By heating the water for half an hour at 55° C. most of these organisms are killed and *V. cholerae*, therefore, lives for much longer in the heated water.

J. H. T. W.

- i. TOHYAMA (Yuzo) & YASUKAWA (Yutaka). **Experimental Results on the Viability of *Vibrio Metschnikoffi* (Substitute for *Vibrio cholerae*) in the Sea of Yokohama Harbour.**—*Japan. Jl. Experim. Med.* June 20. Vol. 8. No. 3. pp. 227–271. With 17 text figs. & 5 figs. & 1 plan on 3 plates. [8 refs.]
- ii. YASUKAWA (Yutaka). **Experiment on the Sterilization of Sea Water by Chlorine. (At Yokohama Harbour.)**—*Ibid.* pp. 273–283. [6 refs.]

i. In Japan cholera is invariably introduced from outside and makes its first appearance usually on the sea coast. The consumption of fish in Japan is on a large scale and the relation of fish to cholera is a question of great interest to Japanese. In this investigation *V. metchnikovi* was used in place of actual *V. cholerae*, and the experiments were carried out with sea water in the actual harbour of Yokohama. It was found that the viability of the vibrio varied according to the season and places examined, being longer in summer and shorter in winter, with a range from 9 days in August to 2 days in February.

ii. This article is concerned with the disinfecting properties of chlorine for the *Vibrio cholerae* when added to sea water in the form of a suspension of bleaching powder. The procedure is not considered effective for a harbour but may be so in the case of small rivers.

W. F. Harvey.

- TETSUMOTO (S.). **Numerical Variation and Surviving Period of *Vibrio cholerae* placed on Aquatic Food Preparations.**—*Japan. Jl. Experim. Med.* 1930. Aug. 20. Vol. 8. No. 4. pp. 353–363. [Govt. Inst. for Infectious Diseases, Imperial Univ., Tokyo.]

In Japan fish of all sorts is very largely eaten and this not so much in the fresh form as salted or tinned or otherwise prepared. This investigation included both the duration of survival and the question of actual increase of *V. cholerae* when planted out on these various preparations. No increase could be detected on salted fish, such as occurs on fresh fish. There was, however, a difference in the survival period, which was greater for the epidermis than for the flesh of fish. In the case of sterile tinned food preparations, the results varied according to the food material used in culture. A gradual increase is reported as occurring on salmon and sea-ear. On other preparations a survival for a longer time than usual was noted or a rapid decrease.

W. F. Harvey.

- GAUTIER (R.). **Epidemiological Study of Cholera in Shanghai.**—*Nat. Med. Jl. China.* 1930. Oct. Vol. 16. No. 5. pp. 595–606. [League of Nations Health Organisation, Eastern Bureau, Singapore.]

This is an interesting paper dealing with cholera generally and the particular conditions which exist in Shanghai. It contains nothing new.

J. H. T. W.

- ESSED (W. F. R.). De aetiologie der pseudocholera.—*Geneesk. Tijdschr. v. Nederl.-Indië*. 1930. Feb. 1. Vol. 70. No. 2. pp. 147-164. [44 refs.]
- LABERNADIE (V.) & NARAYANIN (C.). Note sur l'épidémiologie du choléra à Pondichéry.—*Ann. de Méd. et de Pharm. Colon.* 1930. July-Aug.-Sept. Vol. 119. No. 3. pp. 442-444.
- RAJU (Rao Bahadur V. Govinda) & SIRCAR (B. L.). Results of Inoculation of Cholera Vaccine in Nabadwip (Bengal).—*Indian Med. Gaz.* 1930. Oct. Vol. 65. No. 10. pp. 564-565.
- SINHA (H. K.). Observations on the Choleroid Epidemic at Lucknow (India), 1921.—*Jl. Trop. Med. & Hyg.* 1930. Dec. 15. Vol. 33. No. 24. pp. 389-391 With 5 figs. [King George's Med. College, United Provinces, Lucknow.]

YAWS AND SYPHILIS.

VAN NITSSEN (R.), LEJEUNE (E.), MIGUENS, SERRA (G.) & VAN DEN BRANDEN (F.). Le pian et la syphilis seraient-ils une seule et même affection? [**Are Yaws and Syphilis One Disease?**]
Bruxelles-Méd. 1930. Nov. 30. Vol. 11. No. 5. pp. 118-127.

An interesting article containing the replies from the authors to a questionnaire sent to them by the *Bruxelles-Médical*. The several replies cover much the same ground and do not really bring forth any new evidence upon the unity or duality of the two diseases, but the evidence to all these medical men, whose observations have been made in Central Africa, is in favour of there being two disease entities. Some of the points of differentiation upon which stress is laid are the following: The fact that the two diseases, where they occur side by side, are never mistaken by the native: the characteristics of the initial lesion are different: the evolution of each disease has its own period: inoculated syphilis always produces syphilis, inoculated yaws always yaws: the two diseases may co-exist: the one does not confer an immunity to the other (though in monkeys there may be a partial immunity which may be looked upon as a group reaction): yaws is not inherited, it does not produce abortion and visceral manifestations are rare if ever seen. In regard to those lesions in yaws which might be confounded with syphilitic manifestations van Nitsen believes that with care in practically all cases the trained medical man can make a sure diagnosis. [Some observers refer to the therapeutic test with mercury but it would appear they are merely quoting what was written long ago and has been copied ever since without putting the matter to further test. The same is true of some of the observations made by earlier experimenters—many of these need confirmation. Recent work on immunity has shown how complicated the problem may be and many statements made in the past regarding yaws and syphilis need re-considering. None of the authors of this symposium on yaws mentions the pathological findings in the two diseases.]

Van Nitsen in his conclusion says of the "unitarians" that though their theories are seductive they are based on the hypothesis of treponema tropisms and remain therefore theories.

H. S. Stannus.

BUTLER (C. S.). **Diagnosis and Treatment of Yaws.**—Reprinted from *Internat. Clinics*. 1930. Ser. 40. Vol. 2. 14 pp. With 18 figs. (1 coloured) on 8 plates. [15 refs.]

Surgeon Captain Butler is, as is well known, one of the protagonists of the theory that yaws and syphilis are one and the same disease. In the present paper, which contains nothing new, he enunciates his "articles of faith." It is there for all those who have studied these diseases to read and find out whether they subscribe to his opinions or not. The word "studied" is used advisedly as the reader must be in a position to criticize statements which are made as statements of facts. Only one allusion will here be made. Below the frontispiece the following subscription appears:—"A framboesial face showing a secondary eruption of three months' duration in a Java child aged twelve years. This is what is called for by the text-books in their

definition of yaws, but is rarely seen in practice." The reviewer, while taking no part in the discussion, would like to assure Captain Butler that such cases are common enough where yaws is endemic and at the same time would ask him if he can counterpart the condition from a country where there is no yaws, in other words by a case of syphilis.

H. S. S.

O'REILLY (B. C. N.). Differentiation between Yaws and Syphilis.—*California & Western Med.* 1930. Dec. Vol. 33. No. 6. pp. 881-883.

A short paper read at Elko, Nevada, to draw attention to the possibility of yaws being introduced into California, a possibility not entertained by some of those taking part in the discussion. The paper contains nothing new in regard to yaws and some statements made tend to give false impressions. Africa with its hundreds of thousands of cases of yaws is not mentioned under geographical distribution. "Until comparatively recent times this disease was described only in books on skin diseases" can hardly be accepted. "The primary stage is manifested by a soft papule, soon becoming a painful ulcer" is a poor and, it is believed, incorrect description of this lesion.

Apropos of syphilis and yaws in the same person, the author states—"I have had out-patients (Gilbert Islands) suffering from yaws develop a chancre in the days before salvarsan was used as a treatment for yaws, this proving the separate identity of the two diseases." The author apparently believes that yaws attacks the lungs. 400 men were medically examined in Gilbert Islands prior to shipments to work with a phosphate company. Within a year 10 were repatriated labelled pulmonary tuberculosis—the symptoms being little cough, no fever, slight loss of weight, sputum negative for tubercle bacilli. Treatment with neosalvarsan immediately stopped all symptoms [It is suggested that the evidence in favour of the symptoms being due to framboesia is certainly sketchy.]

H. S. S.

MIGUENS (J.). Le traitement actuel du pian. [Present Treatment of Yaws.]—*Bull. Méd. du Katanga.* 1930. Vol. 7. No. 3. pp. 65-75. [14 refs.]

Miguens again discusses the value of various drugs in the treatment of yaws [see this *Bulletin*, Vol. 27, p. 715] and finds in an oily suspension of dermatol injected intramuscularly the preparation having the greatest advantages. The dose of such a 10 per cent. preparation is in the proportion of 1 cc. per 10 kilogram weight given at 4-day intervals. While a single injection is often followed by clinical cure, a series is better given with a total of 1.5 gm. of the metal. Stovarsol by mouth also gives excellent results. For children 3 tablets each of 0.25 gm. on each of two consecutive days are given and proportionately larger doses for adults.

H. S. S.

CHESNEAU (Pierre). Le pian au Cammon, province du Moyen-Laos. [**Yaws in Cammon, Middle Laos.**]—*Bull. Soc. Méd.-Chirurg. Indochine*. 1930. Feb. Vol. 8. No. 2. pp. 133-160. With 1 folding map.

Yaws was studied in Laos in 1925 by FRANCIÈRE, who commenced the anti-yaws campaign, subsequently further organized by GUILAUME in 1926 and now carried on by the present author. He deals with the geographical distribution of the disease in the province of Cammon, which lies between Vientiane and Savannakhet, Annam and Siam. The population is chiefly Indo-Malay and Mongol; neither shows any particular immunity to yaws. The incidence of yaws depends chiefly on density of population and ease of geographical communication; the greater the incidence the larger the proportion of children with initial infections; males are more commonly affected than females. Clinically the disease resembles that met with elsewhere. Phagedenic ulceration as a complication of framboesial lesions is not so common among the Laotians as among the Annamites. 94 cases (59 men, 35 women) of juxta-articular nodules were noted; in 19 there was no history or other evidence of previous yaws. All were above the age of 20. Besides the ordinary sites, in 3 cases the nodes were situated on the forehead, in 2 on the superciliary ridges, and in 3 in the neck.

Treatment by stovarsol was at first used but later, on account of greater cheapness, salicylate of bismuth was substituted.

H. S. S.

SMITH (E. C.). **Some Dermal Manifestations of Yaws.**—*West African Med. J.* Lagos. 1930. July. Vol. 4. No. 1. pp. 9-11. With 24 figs. on 6 plates. [6 refs.] [Med. Research Inst., Lagos.]

Dr. Smith, writing from Lagos, cites some of the less commonly described [perhaps less commonly recognized] framboesial skin lesions which he has observed in Nigeria. He speaks of them as "atypical sequelae" [perhaps not a strictly true interpretation] and says "reinfection seems to play an important part in the production of these altered types of dermal reaction" [without giving evidence that reinfection has occurred].

Among the earlier lesions he describes the larger depigmented patches and smaller circular areas of skin with slight roughening or powdery exfoliation and similar hyperpigmented areas, both confined to sites of original eruption. The latter histologically show increase in the horny layer with irregular acanthosis. The corium is infiltrated with inflammatory cells, plasma cells predominating and large elongated spindle-shaped rounded or stellar cells loaded with pigment are characteristic; the deeper vessels show perivascular infiltration. Thirdly are mentioned the rounded or oval patches of papular keratosis looking like goose-flesh or lichen with a histological picture of slight generalized hyperkeratosis involving also hair follicles and sweat gland ducts with mild perivascular inflammation. Serpiginous and ringworm varieties of eruption are also mentioned. Among the later manifestations are given (1) mottled depigmentation of hands and lower extremities [originally described by ZIEMANN], (2) markedly hyperpigmented circular or larger irregular, raised areas on the lower limbs with a

rough surface "suggestive of crushed cinders," (3) eczematous and ichthyotic changes in the palms of the hands, (4) keratoderma with cribriform, pin-point pitting or irregular erosions of the thickened horny layer and histologically the marked thickening, hyalinization, parakeratosis and chronic inflammatory exudate, plasma cells and lymphocytes, in the corium, (5) ulcerative lesions which do not show the vascular changes characteristic of syphilis, (6) gangosa.

[These lesions are now probably well recognized in all yaws countries but the descriptions are good and the photographs excellent.]

H. S. S.

CHESTERMAN (Clement C.). **Melanoma following "Crab-Yaws."**—*Lancet*. 1931. Jan. 24. pp. 183-184. [3 refs.]

At Yakusu in Belgian Congo among 40,000 native sick seen in 10 years, 8 cases of malignant disease were diagnosed, and of these 3 were cases to which the name of melanoma was given, three males, ages 35, 45 and 45, with growths on the soles of the feet at the site of old crab-yaws and enlarged crural glands. The tumours were respectively the size of a golf ball, a tangerine orange and a cricket ball. In the second case the glands broke down and a black discharge issued from the sinuses, the patient subsequently dying with secondary deposits in lungs and liver. In the third case the glands were removed. The clinical diagnosis was supported by a pathological report in the first case—"melanotic sarcoma of low malignancy with a considerable degree of fibrosis." Dr. Chesterman then says, "yaws must be regarded . . . as a potential carcinogenic agent" and thinks that the native practice of holding the part affected with crab-yaws in the hot smoky flame produced by burning powdered resin, may be another factor, "bearing in mind the well-known carcinogenic properties of soot, tar, etc."

[In view of the great difficulty in interpreting the histological picture in melanoma and the interest the problem offers, one may hope that Dr. Chesterman's specimens will be very carefully reported on. The occurrence of melanomas following trauma has been recognized and they have been noted as specially frequent on the soles of the feet at all ages. For an interesting discussion on The Problems of Melanoma see paper by Prof. James EWING, *Brit. Med. J.*, 1930, Nov. 22, p. 852.]

H. S. S.

AARS (Ch. G.). **Corymbiforme exantheemvormen bij syphilis en framboesia. [Corymbiform Eruption in Syphilis and Yaws.]**—*Geneesk. Tijdschr. v. Nederl.-Indië*. 1930. Nov. 1. Vol. 70. No. 11. pp. 1096-1100. With 4 plates. [3 refs.] [Milit. Hosp., Paramaribo.]

The author saw in Surinam (Dutch Guiana) two cases of corymbiform yaws and one of corymbiform syphilis; these three cases are described. A corymbiform exanthem is a rare manifestation of yaws in Surinam; in the two cases described it was accompanied by papulo-miliary lesions. If lesions resembling *lichen spinulosus* (as in these two cases) should prove to be common in cases exhibiting a corymbiform eruption it might serve as a useful diagnostic feature from syphilis.

W. J. Bais.

KAISER (L.). De framboesia-bestrijding in Mandar (Celebes) van 1925-1929. [**Combating of Yaws in Mandar (Celebes), 1925-1929.**] —*Geneesk. Tijdschr. v. Nederl.-Indië*. 1930. June 1. Vol. 70. No. 6. pp. 574-575.

The author administered neosalvarsan injections in increasing numbers from 5,736 in 1925 to 22,789 in 1928, but did not succeed in stamping out yaws in the district. The efficacy of the injections was marked enough and the author discusses the epidemiological influences which cause the endemic to persist. He considers plantar and palmar affections as well as crusts, dropping from the healing lesions, as so many sources of infection. Accordingly he initiated propaganda to ensure cleanliness, especially the use of soap and water, among his native patients and asserts that success followed these measures, only 17,237 injections being necessary in 1929.

W. J. Bais.

- i. SCHÖBL (Otto), TANABE (Bunshiro) & MIYAO (Isao). **Preventive Immunization against Treponematous Infections and Experiments which indicate the Possibility of Antitreponematous Immunization.** —*Philippine Jl. Sci.* 1930. June. Vol. 42. No. 2. pp. 219-237. [8 refs.]
- ii. — & GARCIA (Onofre). **Serologic Reciprocity between Yaws and Syphilis.** —*Ibid.* pp. 203-217. With 8 figs. (4 folding). [3 refs.]
- iii. —. **Experimental Study of Immunologic Reciprocity between Yaws and Syphilis, considering also other Phases of Immunity besides the Complete Resistance to Infection.** —*Ibid.* pp. 239-250. [5 refs.]

The following conclusions are given by the authors:—

i. "We have in these experiments indicated a procedure, unique of its kind, in treponematous diseases and unsurpassed in preventive immunization of any disease, whereby through the use of killed and harmless vaccine an immunity of long duration may be induced in experimental animals more rapidly than by the most severe infection."

"1. Specific treatment with neosalvarsan given after tests for immunity by inoculation has no effect on the immunity produced by yaws vaccination.

"2. Immunity to yaws produced by yaws vaccination prevents the development of a specific syphilitic lesion, but does not necessarily prevent the penetration of treponemas of syphilis into the regional lymph glands corresponding to the point of inoculation with syphilis."

ii. "1. The behaviour of serologic reactions as a consequence of superinoculation in treponematoses points to sensitization as the underlying principle. An early serologic response and a late one are frequently detectable in animals singly inoculated with treponemas. The early response is coincident with the primary treponematous lesion and is an indication of strong sensitization of the animal's tissues; the late one is coincident with the full development of immunity and indicates the time when a lesion will no longer develop upon superinoculation.

"2. Superinoculation, performed on infected or vaccinated animals, increases and accelerates the late serologic response. This indicates that similar conditions may exist with regard to immunity to treponematoses.

"3. Serologic reciprocity between yaws and syphilis exists. The serologic effect of cross-superinfection follows the same laws that govern the serologic effect of superinfection with homologous treponemas.

"4. The serologic reactivity of a given experimental animal is directly proportionate to the tissue reactivity of that animal towards the particular kind of treponemas; in other words, it stands in direct proportion to the number of invading parasites."

iii. "1. Yaws-infected monkeys are susceptible to cutaneous infection with syphilis during the early stage of yaws during which they are susceptible to yaws

"2. Superinfection with syphilis of yaws-infected monkeys hastens the onset of immunity to yaws.

"3. This phenomenon brings further proof of immunologic relationship between yaws and syphilis and shows that the biologic difference between *treponema framboesiae* and *treponema luis* is one of organotropism, or tissue selectivity."

"1. There exists an immunologic relationship between yaws and syphilis with regard to the negative phase which is responsible for the occurrence of exacerbations and relapses in treponematoses.

"2 The immunity following yaws vaccination in some instances is not as firmly established as the immunity following yaws infection with clinical manifestations.

"3. Treponemas of yaws may survive for a considerable time in the skin of immunes to yaws, without producing a lesion."

H. S. S.

SCHÖBL (Otto). **Further Experiments concerning Immunologic Reciprocity between Yaws and Syphilis.**—*Philippine Jl. Sci.* 1930. Oct. Vol. 43. No. 2. pp. 263-264. [1 ref.]

"Eleven Philippine monkeys that had gone through yaws infection and were proven to be immune to yaws were inoculated with syphilis by intradermal injection on the scrotum. Two normal control animals were included in the test for immunity to syphilis. The shortest interval of time between the first inoculation with yaws and the test for immunity to syphilis was twelve months, the longest twenty-one months. Following the inoculation with syphilis the places of inoculation were inspected regularly for a period of five months. At various intervals of time the inguinal lymph glands corresponding to the point of inoculation with syphilis on the scrotum were removed aseptically and transplanted to the testicles of normal rabbits. The rabbits were inspected weekly for a period of five months and the results were noted. The details are evident from Table 1.

"None of the yaws-immune monkeys developed lesions at the places of inoculations with syphilis and none of them harbored viable *treponema luis* in the lymph glands corresponding to the places of inoculations with syphilis. All normal control monkeys developed typical syphilitic lesions and harbored viable *treponema luis* in the lymph glands corresponding to the places of inoculation with syphilis." [See also this *Bulletin*, Vol. 27, p. 717.]

H. S. S.

i. SCHÖBL (Otto). **Immunologic Reciprocity between Syphilis and Yaws.**—*Philippine Jl. Sci.* 1930. Dec. Vol. 43. No. 4. pp. 583-588.

ii. —. **The Immunologic Effect of Repeated Yaws Infections interrupted by Specific Treatment given in the Early Stage of Initial Yaw.**—*Ibid.* pp. 589-594. [4 refs.]

iii. —. **The Duration of Antitreponematous Immunity with Regard to Syphilis in Philippine Monkeys.**—*Ibid.* pp. 595-598.

iv. SCHÖBL (Otto). **The Duration of Antitreponematous Immunity in Philippine Monkeys originally conveyed by Immunization with Killed Yaws Vaccine.**—*Ibid.* pp. 599–601. [6 refs.]

v. ——. **The Immunologic Effect of Antitreponematous Vaccine Therapy administered after Specific Treatment which was given in the Early Stage of Initial Local Yaws in Philippine Monkeys.**—*Ibid.* pp. 603–609. With 1 text fig. [6 refs.]

Schöbl in five short communications publishes the results of further experimental investigations into yaws; his conclusions are as follows:—

i. "1. Immunologic reciprocity exists, not only between yaws and syphilis but also between syphilis and yaws.

"2. Syphilis in Philippine monkeys produces immunity to itself much sooner than it does to yaws and sooner than yaws does to itself.

"3. Superinoculation with syphilis of syphilitic monkeys performed in the stage of tissue nonreactivity does not hasten the immunity to yaws.

"4. Superinoculation of syphilitic monkeys with yaws, performed at a time when they have reached the stage of nonreactivity to syphilis but still react by formation of typical yaws to inoculation with yaws, does not hasten the immunity to yaws within the period tested.

"5. The immunologic reciprocity between yaws and syphilis is group immunity. One of the two immunizes against itself quicker than against the other."

ii. "1. Repeated local yaws infections terminated by specific treatment given before the time when generalized yaws manifestations occur produce immunity in Philippine monkeys, even though delayed.

"2. The incubation period becomes irregular, mostly prolonged with the repeated reinoculations terminated by treatments. This shows that the developing immunity, although not yet strong enough to suppress completely the development of lesion, has a definite effect upon the incubation period. This observation strengthens our claim that sensitization is the underlying principle of immunity in treponematoses.

"3. The findings made on monkeys corroborate and amplify the findings previously made on human volunteers and prove that immunization against yaws by means of repeated local yaws infections terminated by treatments is possible.

"4. Jointly with our previous experimental evidence these results indicate that the most favorable time for immunization in treponematoses is the early stage of infection and that it must be carried out vigorously within the first few months of infection or immunization."

iii. "If it is considered that the immunity to syphilis in Philippine monkeys sets in about one and one-half months after the inoculation with syphilis and in about eight months after inoculation with yaws, the persistence of immunity to syphilis in Philippine monkeys is clearly evident. There is every reason to believe that immunity to syphilis, like immunity to yaws, lasts throughout the natural life of these animals."

iv. "Antitreponematous immunity in vaccinated monkeys that have been proven immune to skin inoculation with yaws and syphilis is of as long duration as the immunity induced by infection accompanied by specific skin lesion."

v. "1. Vaccine therapy with killed syphilis vaccine performed on yaws-infected and early treated monkeys accelerates the onset of immunity to yaws.

"2. The immunity to yaws as a consequence of syphilis vaccine treatment administered to early cured yaws monkeys develops earlier than it does in early cured non-vaccinated yaws monkeys and earlier than it develops in untreated yaws monkeys with local yaws only.

"3. The immunity under the conditions of vaccine treatment just mentioned, develops as early after the vaccination as it does in yaws-infected untreated monkeys after the generalization of the yaws process.

"4. These findings are further proof of immunologic reciprocity between yaws and syphilis and corroborate our previous findings that superinfection with syphilis of yaws-infected monkeys accelerates immunity to yaws.

"5. This experiment proves our contention deduced from former experiments that vaccination administered early to recently sensitized animals has the same immunologic effect as generalization of the treponematous process. It confirms our former findings concerning vaccination in treponematoses."

H. S. S.

- i. MIYAO (Isao). **An Inquiry into the So-called Latent Infection in Yaws-Vaccinated Monkeys as a Possible Result of the Test for Immunity by Intradermal Inoculation with Living Yaws Material.**—*Philippine Jl. Sci.* 1930. Nov. Vol. 43. No. 3. pp. 425–428. [5 refs.]
- ii. ——. **Immunologic Relation between Three Philippine Strains of Yaws.**—*Ibid.* pp. 429–432. [8 refs.]
- iii. ——. **Is Framboesia Tropica a Nosologic Entity?**—*Ibid.* pp. 433–449. [18 refs.]

i. The wording of this article makes it rather difficult to read, as shown in the two opening paragraphs quoted below:—

"The theory that latent infection is the cause of resistance and not the consequence of immunity in treponematoses is still found in the literature. Therefore, one of the objections to the interpretation of the findings made in the test for immunity in yaws-vaccinated monkeys was the possibility that following the first infection, as a test for immunity, a latent infection developed in vaccinated and immune animals. However, the development of the resistance to inoculation in yaws-vaccinated monkeys was too sudden to be due to the infection as a test for immunity, and the resistance was found constantly in all vaccinated monkeys that were inoculated later than six weeks after the vaccination began.

"Nevertheless, it was deemed advisable to make an experimental inquiry into the possibility of latent infection in such animals, particularly in view of the great stress that is laid on this condition in experimental syphilis as an explanation of resistance to inoculation."

Monkeys previously inoculated with a killed yaws vaccine did not develop a lesion when subsequently inoculated on the scrotum with a living yaws virus. The point at issue was, were they really immune or did they develop with the second inoculation a latent infection? An emulsion of the groin glands was made and examined by dark field illumination and also by injection into clean animals. The results were negative and prove, it is held, that no latent infection occurred.

ii. The author's conclusions are summed up in his own words:—

"The tabulated results of our experiments show that immunologic reciprocity between heterologous strains of yaws exists. The time necessary for the development of immunity produced by infection with one strain of yaws towards another strain may vary somewhat; particularly if the immunizing strain produces feeble and short-lived lesions, the development of cross immunity may be delayed, as was the case with the Katayama strain."

iii. In this paper which was presented as a thesis for the degree of "Hakushi" in Medicine the author discusses the points of difference between yaws and syphilis from clinical, distributional, immunological, chemotherapeutical and pathological points of view, and comes to the conclusion that the two diseases belong to one group and show close relationship, but are fundamentally distinct.

H. S. S.

KAKISHITA (M.). Beiträge zur experimentellen Frambösie. [**Experimental Yaws.**]—*Zent. f. Bakt.* I. Abt. Orig. 1930. Dec. 22. Vol. 119. No. 3/4. pp. 212-217. [10 refs.] [Bact. Inst., Med. Faculty, Kanazawa, Japan.]

The following is a summary of the results obtained in rabbits and guineapigs experimentally infected with yaws. Intratesticular inoculation in rabbits was successful in 19 out of a total of 31; scrotal inoculation gave 5 positive results out of 21. The incubation period was from 12 to 59 days with an average of 28. During the 2 years which have elapsed since inoculation no metastatic lesions have occurred in rabbits inoculated in the genitals. Successfully inoculated animals showed positive W.R. and M.T.R. The positive reactions lasted longer than the clinical signs. Subinoculation in guineapigs has been carried through 5 passages. Of the various sites used for genital inoculation, the prepuce is the best. Subinoculation from guineapigs to rabbits has been carried out. Subinoculation into a rabbit of tissue from the site of an inoculation done in an ape 450 days previously was successful with recovery of spirochaetes. It is impossible to differentiate the granular periorchitis produced in rabbits from the lesion following syphilitic inoculation. Cross inoculatory tests are not satisfactory since the results are not uniform. The scaly lesions obtained in guineapigs are worthy of note but it is not certain whether any generalization is possible.

H. S. S.

HASSELMANN (C. M.). Frambösie und Syphilis. [**Yaws and Syphilis.**]—Reprinted from *Zent. f. Haut- u. Geschlechtskrankheiten*. Vol. 33. No. 5/6. pp. 273-299. [2 pages of refs.]

An article dealing with yaws and its relation with syphilis from the point of view of what has been written on the subject during the past few years. It might in fact almost be a résumé of the summaries which have appeared in this *Bulletin*.

H. S. S.

SARGENT (Willard S.). **A Case of Deformity due to Yaws.**—*Milit. Surgeon.* 1931. Feb. Vol. 68. No. 2. pp. 179-182. With 1 fig.

The report of a case in which the author believes contractures of muscles causing flexion at hips and knees were due to nerve lesions.

H. S. S.

SHATTUCK (George C.) & GOODNER (Kenneth). **Preliminary Communication on Treponematosis in Yucatan.**—*Amer. Jl. Trop. Med.* 1930. May. Vol. 10. No. 3. pp. 177-182. [6 refs.]

A short paper by members of the Yucatan Medical Expedition of 1929 giving the results of their search for syphilis and yaws among

two groups of people, (a) the Maya Indians, who it is believed are essentially a pure stock descended from the inhabitants who lived in this region at the time of the Spanish Conquest, (b) Yucatecans or people of mixed Indian and Spanish origin. No case of yaws was seen in either group, and no case of syphilis among the Mayas. Kahn tests done among 150 Mayas gave 3 doubtful and one positive result; the subject giving the positive result was almost certainly a man of mixed blood and not a pure Maya. Among 121 Yucatecans there were 10 positives and 4 doubtful reactions.

H. S. S.

MIYAO (Isao). **Note on the Viability of *Treponema luis*.**—*Philippine Jl. Sci.* 1930. June. Vol. 42. No. 2. pp. 199–201. [3 refs.]

Using a rabbit testicle tissue suspension of Nichols' strain of syphilis, intratesticular inoculations were made into normal rabbits, after intervals varying from 30 minutes to 24 hours at 28.5° C., the result being positive in every case (18), thus agreeing with the findings of LACY and HAYTHORN (1921).

Two other experiments showed that virulence may be retained for at least 4 hours at 37° C. and at 0° C. The treponema of syphilis is therefore more resistant to adverse conditions than that of yaws, which according to YASUYAMA only survived at 28.5° C. and 37° C. for 2 hours and died at 0° C. in less than 15 minutes.

H. S. S.

SELLEI (Josef). *Tumor fibrosus syphiliticus*. Ueber die sogenannte juxtaarticuläre Knotenbildung bei Syphilitikern. [**The So-Called Juxta-Articular Nodules in Syphilitics.**]—*Arch. f. Dermat. u. Syph.* 1930. Oct. 22. Vol. 162. No. 1. pp. 176–179. [9 refs.] [Charité Polyclinic, Budapest.]

The author describes under the designation of *Tumor fibrosus syphiliticus* two cases of juxta-articular nodular formations in patients seen in Budapest.

The first, a woman 37 years old who for 8 years had had 3 nodes about the right knee, two the size of hazel nuts, the third as large as a walnut. She had no other signs or symptoms, the joint was normal, no glandular enlargement but the W.R. was triple positive and the husband had been treated for syphilis. The nodes were sharply defined, subcutaneous, hard, fibrous and painless, the skin over them being moveable and slightly pigmented. Salvarsan and mercury had no effect but with potassium iodide there was some diminution in size. The second case was a male with 2 similar nodes on the ulnar border left arm. W.R. +++ : anti-syphilitic treatment caused slow retrogression.

These two cases resemble exactly the four cases originally described by Sellei in 1918 and he points out that he has priority in having described cases of this condition which subsequently have been commonly referred to as J.A.N. with a syphilitic etiology. The four cases originally recorded by Sellei were Bosnian soldiers sent on to the dermatological clinic of the Garrison Hospital, Budapest. The first had a tumour the size of an egg over the left trochanter, the second a mass the size of a child's fist over the left ankle, the third a node the size of a duck's egg about the right ankle, and the fourth presented a swelling the size of a child's fist over both trochanters. Though there were no obvious manifestations of syphilis three of the four had positive

W.R. None had been abroad. The histological picture is that of a granuloma showing few cells but marked connective tissue proliferation and but little blood-vessel formation, and there was little reaction to anti-syphilitic treatment. The facts are against their being really gummatous in nature. Sellei believes therefore that they are rather of the nature of allergic tissue reactions, and that similar formations occur in other diseases, yaws, leprosy, rheumatism, etc., including conditions which have been called sarkoid and which he regards as an allergic reaction in tuberculosis.

He suggests the descriptive terms Tumor fibrosus syphiliticus, Tumor fibrosus framboesicus, tuberculoticus, etc.

H. S. S.

DELANOE (P.). Un cas de nodosités juxta-articulaires sensibles au traitement antisiphilitique. [**Case of J.A.N. Susceptible to Anti-Syphilitic Treatment.**—*Arch. Inst. Pasteur d'Algérie*. 1929. June. Vol. 7. No. 2. pp. 202-203. [1 ref.]

The author puts on record a case of J.A.N. similar to that described by M. PICOUT-LAFOREST [this *Bulletin*, Vol. 21, p. 13] in a native of the Sahara in which the syphilitic etiology was proved.

In the present case a woman of 35 years, a native of Morocco, presented a multilobulated node at each elbow "the size of a nut" and of the hardness of cartilage, freely moveable. In the front of each knee about an inch above the patella there was a mass which suggested fatty tissue, the right containing a harder mass within it the size of a nut. The body was covered by a papular syphilide. 0.3 gm. N.A.B. was given intravenously and 12 gm. pot. iodide taken by mouth. Seen two years later all symptoms, which disappeared soon after treatment, had remained absent.

H. S. S.

MOUQUET (A.). Présentation d'un squelette de Cercopithecus atteint de "goundou des singes." [**A Cercopithecus Skeleton affected with Goundou.**—*Bull. Soc. Path. Exot.* 1930. May 14. Vol. 23. No. 5. pp. 478-482. [1 ref.]

The monkey (*Cercopithecus aethiops*), the skeleton of which forms the subject of this brief communication, was shown at a meeting of the Society on December 11th, 1929. The author examines the facts now available in an attempt to decide whether the "goundou of monkeys" is of the nature of osteomalacia, whether it is the same condition as met with in man, whether it is a disease of captivity.

The skull is composed of spongy bone and the bones of the face are porous and of the consistence of rusk, while some of the long bones are softened and can be bent with pressure. The humeri show marked thinning of the compact bone with increase in spongy tissue, the cavity being filled with a pathological marrow. The other long bones of the limbs show similar changes, the vertebral column, ribs and pelvis being also affected—a general demineralization with sponginess of the whole skeleton, softening of long bones and tumefaction of the bones of the face, lesions characteristic of osteomalacia and osteoporosis in man and animals. In animals the affection of the bones of the head is often very marked, as seen in pigs, goats and horses. Mouquet believes that the condition has never been demonstrated in animals in the wild state and points out that there is evidence that certain osteopathies of this type are contagious and perhaps inoculable; they may be cage infections and in this connexion it is worthy of note that the female cage companion of the dead monkey had a small paranasal swelling.

The possibility of this infective process playing a part in the etiology does not put out of court some food deficiency being also involved. On the other hand, that this disease of monkeys and goundou in man are probably of framboesial origin does not seem to receive support.

MESNIL, discussing the communication, believes that the two diseases are one and the same on clinical and histological grounds, adding that both conditions are only met with in man and monkeys from the west coast of Africa [Goundou of course has a much wider distribution than MESNIL is aware of.]

H. S. S.

HERIVAUX ["Pseudo-goundou" lépreux.] [**Leprous Pseudo-Goundou.**]
—*Bull. Soc. Path. Exot.* 1930. Oct. 8. Vol. 23. No. 8. pp. 867–868. With 1 text fig.

A note upon a case of mixed leprosy in a young female observed in Madagascar who presented on each side of the nose a hard swelling resembling goundou. Puncture fluid showed numerous lepra bacilli. Radiographical examination gave no definite evidence as to whether the bone was enlarged or not. The patient was free from yaws. The case is referred to as one of leprous pseudo-goundou.

[It is a pity more definite information is not given. Leprous nodules occurring in the paranasal position are not uncommon but they essentially are swellings of soft parts while in goundou the affection is of the bone. There seems every reason to suppose that this case should not therefore have been labelled "pseudo-goundou."]

H. S. S.

DEY (Nepal Chandra). A Study of Yaws in Khetri Area, Kamrup, Assam.—*Indian Med. Gaz.* 1930. Aug. Vol. 65. No. 8. pp. 421–426. With 19 figs. on 4 plates. [3 refs.]

CLIMATIC BUBO.

Low (G. Carmichael). **Climatic Bubo : its Diagnosis and Treatment.**—*Jl. Roy. Nav. Med. Serv.* 1930. Oct. Vol. 16. No. 4. pp. 272–275.

After a short historical survey including an allusion to the question whether climatic bubo of the tropics is identical with lymphogranuloma inguinale, the author mentions those cases under his own observation at the Hospital for Tropical Diseases, London. The intradermal test of FREI was carried out by Dr. Hamilton FAIRLEY using as antigen a gland preparation made from one of the cases by the method described by HELLERSTRÖM. The results were negative. Tests have since been carried out using an antigen supplied by Hellerström in two cases. In both the results have been inconclusive. The author states, "More work will therefore be required before coming to a definite conclusion as to the value of this test and the identity of tropical climatic buboes and other forms of adenitis seen in Europe." The method of treatment advised is that by protein shock after the manner described by HANSCHALL. [The work of other observers on the continent in recent years would seem to have proved the identity of the two conditions mentioned and to place the skin reaction in a sure position.]

H. S. Stannus.

MUSGER. Zur Aetiologie der Nicolas-Durand-Favreschen Krankheit des sog. Lymphogranuloma inguinale. [**Aetiology of Lymphogranuloma inguinale.**]*—Arch. f. Dermat. u. Syph.* 1930. May 27. Vol. 160. pp. 94-97.

The author presents his bacteriological findings in three cases of lymphogranuloma inguinale, the first and third being cases reported by VON FUHS and by VON URBACH respectively. In all three cases a rod-shaped organism was demonstrated in the blood and gland juices and also in sections of affected glands after search. The organism was also recovered in two cases in blood-broth culture but only after seven days. In the tissues the organisms lie between the cells singly or in pairs, sometimes alongside each other, in other cases end to end. Subcultures were obtained best on Loeffler's serum at body temperature; on agar the colonies are smaller and under magnification appear granular. Growth is slow and occurs aerobically, but the organism is also a facultative anaerobe. Morphologically smears from cultures show the organism to be a slender rod without capsule or spores but often butt-ended at one pole and Neisser preparations show polar staining.

Guineapigs, rabbits, white mice and monkeys were inoculated subcutaneously, intramuscularly, intravenously, intraperitoneally and by the intratesticular route, the first mentioned being the most suitable animal by the intraperitoneal method. Changes occurred in glands after three weeks closely resembling those in the human disease both macroscopically and microscopically.

A series of agglutination and complement deviation tests were contrived but proved negative, while immunological tests were indefinite.

H. S. S.

DUPAS (J.). Le diagnostic de la poradénite inguinale (maladie de Nicolas Durand et Favre et bubon climatique). [**Diagnosis of Climatic Bubo.**]*—Arch. Méd. et Pharm. Nav.* 1930. Jan.-Feb.-Mar. Vol. 120. No. 1. pp. 5-90. [6 pages of refs.] [Sainte-Anne Marine Hosp., Toulon.]

The author gives his observations based on 13 cases of what he classes as "poradénite nostras," 4 cases of "poradénite tropicale (bubon climatique)" and 2 cases of "poradénite bacillaire" [tuberculous], the case histories taking up some 50 pages. The clinical aspects are then discussed, the observer agreeing with others that there is nothing to distinguish those cases arising in Europe from those which have been called climatic bubo. He also points out how difficult it is to make a differential diagnosis from some cases of tuberculous lymphadenitis in the groin. He has not seen any cases in which an extension of the process has affected other groups of gland except the iliac. Swelling of the iliac glands, however, he regards as others have done as rather characteristic. In four only of the 17 cases was there an initial genital lesion. General symptoms were very variable. The polynuclear leucocytosis is usual but of no diagnostic value. Investigations directed towards finding a specific cause were negative. The author did not make use of the intradermal reaction, now so well known, for diagnosis. Treatment is discussed without any new ob-

servations. A bibliography for the years 1922-29 is given and reference made to the bibliography in PHYLACTOS' Lyons thesis (1922).

H. S. S.

RUIZ (Fernando R.) & FOTHERINGHAM (Wenceslao Tejerina). Pseudodenisitis inguinal sub-aguda. [**Climatic Bubo.**]*—Semana Méd.* 1930. Oct. 23. Vol. 37. No. 43 (1919). pp. 1249-1271. With 19 text figs.

A general account of this condition as regards its incidence and a detailed description of the morbid anatomy and histology of the affected glands, illustrated by reports of three cases and photographs depicting the naked eye and microscopic changes. The author, while noting that the disease is one of young adults, maintains that there are considerable numbers not due to sexual intercourse. He divides the symptoms into the stages of (1) induration of glands with slight rise of temperature of variable duration, succeeded by (2) softening, breaking down and suppuration with involvement of overlying skin to produce (3) fistulae. Treatment by antimony is mentioned, but the only certain cure is by extirpation. All these points are exemplified in the three cases detailed.

H. H. S.

GARCIA MALDONADO (L.). Diez casos de bubon tropical. [**Ten Cases of Climatic Bubo.**]*—Reprinted from Rev. Soc. Med.-Quirurg. del Zulia.* [Venezuela]. 1930. Mar. 31. Vol. 4. No. 3. pp. 150-158.

All ten were males between 20 and 32 years of age. Three denied having ever contracted or risked venereal disease, four had had gonorrhoea fairly recently (six months or less), and three had had venereal disease some years before. All were treated with stibenyl and eight were cured with doses varying from 30 cgm. to 2.7 gm. and given in 15 to 50 days; two benefited but slightly; these received 3 and 4 gm. respectively in 76 and 70 days. The author finds an intradermal test with pus heated to 56° C. useful in diagnosis.

H. H. S.

FREUDENTHAL (W.). Unspezifische Wassermann usw.-Reaktion bei Lymphogranuloma inguinale. [**Non-Specific Wassermann and Similar Reactions in Lymphogranuloma inguinale.**]*—Deut. Med. Woch.* 1930. Dec. 26. Vol. 56. No. 52. p. 2216. [2 refs.] [Skin Clinic, Univ., Breslau.]

The following observations were made in connexion with a 39-year-old male patient at the Breslau polyclinic. On November 26th, 1929, he presented a roseolous eruption; the W.R. was negative. On March 3rd, 1930, he returned with the inguinal glands on both sides swollen; no lesion on penis found. Lymphogranuloma reaction of Frei was +++ using two antigens which gave negative reactions in two controls. A diagnosis of L.I. was made and the treatment by neostibosan was instituted, the total amount given in two months being 4.3 gm. During treatment the gland masses increased in size, softened and opened on the surface, right side on 30.iv.30, left 18.iv.30.

The following table gives the serum reactions :—

	W.R.	Citocholl	Meinicke Clear	Kahn	Meinicke Turbid
26.xi.1929 ...	0	0	0	—	—
3.iii.1930 ...	0	?	0	+?	—
7.iii.1930 ...	?	+	0	+	0
10.iii.1930 ...	?	+	0	+	0
15.iii.1930 ...	?	+	0	+	0
23.iii.1930 ...	0	+	0	0	—
7.iv.1930 ...	0	0	0	0	0
13.v.1930 ...	0	0	0	0	0

The positive reactions might suggest a suspicion of syphilis but the Luetin reaction was negative and there was no history of syphilis (or malaria) and no signs or symptoms of that disease. These partial temporary positive reactions must therefore be looked upon as non-specific reactions comparable with those seen sometimes in malaria and less commonly in *ulcus molle*. These facts, however, do not seem to be generally recognized as only RAVAUT and RABEAU have previously alluded to them. It is important from all points of view that these possibilities be not forgotten.

H. S. S.

TARAYRE. La lymphogranulomatose (maladie de Nicolas-Favre) dans le milieu militaire colonial. [**Climatic Bubo in the (French) Colonial Army.**]—*Bull. Soc. Méd.-Chirurg. Indochine*. 1930. July. Vol. 8. No. 7. pp. 716-728. [1 ref.]

A general discussion on climatic bubo with histories at considerable length of two cases observed in Indochina.

H. S. S.

ISOTTI (Filippo). Contributo alla diagnosi di adenite climatica mediante la intradermoreazione. [**The Intradermal Reaction in the Diagnosis of Climatic Bubo.**]—*Arch. Ital. Sci. Med. Colon.* 1930. Aug. 1. Vol. 11. No. 8. pp. 480-489. With 1 text fig. English summary (4 lines). [Lab. of Colonial Path., Villa Torri, Bologna.]

The author confirms the usefulness of the intradermal reaction, already fully described by other writers, in the diagnosis of cases of climatic bubo met with in the province of Bologna.

H. S. S.

LÖHE (H.) & BLÜMMERS (K.). Weitere Beobachtungen ueber das Vorkommen der Lymphogranulomatosis inguinalis in Berlin. [**Lymphogranuloma inguinale in Berlin.**]—*Med. Klin.* 1930. May 30. Vol. 26. No. 22. pp. 807-808. [1 ref.] [Rudolf Virchow Municipal Hosp., Berlin.]

A short note emphasizing the absolute specificity of the intracuti-reaction in lymphogranuloma inguinale.

H. S. S.

HVAL (Einar). Lymphogranulomatosis inguinalis subacuta.—*Norsk. Mag. f. Laegevidenskapen*. 1930. Nov. Vol. 91. No. 11. pp. 1229-1234. [2 refs.] [In Norwegian.]

GRANULOMA VENEREUM.

GIGLIOLI (George). **The Differential Diagnosis of Phagedenic Chancroid and Granuloma Inguinale.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1930. Apr. 17. Vol. 23. No. 6. pp. 579-589. With 2 charts & 1 plate. [12 refs.]

The author, writing upon observations made in Central America, shows that granuloma inguinale and venereal phagedena are often confused and cases wrongly diagnosed. Unrecognized cases of V.P. he believes account for many of the so-called tartar emetic resistant granulomas and would thus explain cases reported by HANSCHALL. The two conditions may easily be diagnosed clinically and a table of differential diagnosis is given. In V.P. he finds the intradermal allergic reaction, using extracts of Ducrey's strepto-bacillus, specific. For G.V. he believes antimony to be specific and protein shock treatment useless; for V.P. protein shock or vaccine therapy is indicated.

H. S. Stannus.

BIRCH (C. Allan). **Granuloma inguinale resembling a Primary Chancre.**—*Brit. Med. J.* 1929. Aug. 24. p. 345. [Royal Infirmary, Liverpool.]

Dr. Birch records the case of a ship's steward seen at the Royal Infirmary, Liverpool, who presented a punched-out ulcer with undermined edges, bleeding easily, the base covered with healthy granulations, situated on the glans penis, of three months duration which originally developed as a papule four days after exposure to venereal infection in Brazil. W.R. negative, spironemes not found and anti-syphilitic treatment ineffective. After five injections of stibosan given on alternate days with a total of 1.5 grams complete epithelialization had occurred.

H. S. S.

MACIEL (Heraldo). **Notas colhidas na observação de um caso do granuloma venereo. [A Case of Granuloma Venereum.]**—*Sciencia Med.* 1929. Oct. Vol. 7. No. 10. pp. 517-522. With 1 plate.

A full account of a case of granuloma venereum in a male native of Pernambuco infected at the time of a single extra-conjugal coitus in Rio Grande in 1924. A lesion in the form of a nodule at the side of the anus with intense pruritus appeared. Pederasty was denied. Returning to Rio de Janeiro at the end of the year, he continued sexual relations with his wife until six months before his entry into hospital. The wife during this time had not acquired the disease and during her husband's stay in hospital gave birth to a child which up till the age of four months presented nothing abnormal. In the man the disease had been slowly progressive, invading the anal margin, perineum, scrotum and groins. At first painful, later it became painless.

Local treatment by silver nitrate and thermocautery had been tried, later antisymphilitic treatment was administered in spite of a negative W.R. In 1928 the condition was recognized, the Calymmatobacterium was found in abundance in the advancing edge of the ulcer and treatment with neostibosan yielded good results.

H. S. S.

BERIBERI AND EPIDEMIC DROPSY.

MAHADEVAN (V.) & RAMAN (T. K.). **Report on an Investigation of Beriberi at Guntur.**—*Indian Med. Gaz.* 1930. Oct. Vol. 65. No. 10. pp. 555-564. With 2 graphs, 3 maps & 4 figs. in text. [6 refs.] [Govt. Headquarters Hosp., Guntur.]

The district of Guntur, as regards beriberi, is one of the most affected regions of the Madras Presidency. During the year 1929-30 the authors investigated over 100 cases of the disease. The following are among the observations made. Though many cases occur among Hindus, the relative incidence in this community is actually lower than in others. Married people are more often affected than single, and the highest age-incidence is between 16 and 40 years. Infantile beriberi is not seen in this district. Males are more frequently attacked than females, and labourers more than others. [From a table, it would appear at first sight that police constables were especially liable.] The greatest beriberi incidence is between June and October. A table shows the number of rice factories in various parts of the Guntur District, and their relation to the number of cases; while geographical details are shown by maps.

The autopsy findings are collected from 4 cases. In brief, these are—effusion in all serous cavities, especially the pericardium; dilatation and hypertrophy of the heart; and congestion of the liver, spleen, kidneys, brain, suprarenals and duodenum.

There are four types of the disease: (1) *Larval type*, or earliest stage, in which paraesthesiae, slight swelling and tenderness of the calf muscles, anaesthesia of the legs, and diminished or absent knee jerks are noticed. (2) *Wet Beriberi*. Besides the usual findings, the authors stress the presence of fever of about 5-days duration in some 25 per cent. of the cases. (3) *Paraplegic or Dry Beriberi*. This is regarded as an advanced stage of the wet type with paralysis of the affected limbs, ataxic gait, wasted calf muscles and foot drop. (4) *Acute pernicious form*. Five out of 91 cases admitted to hospital during the year were of this type. The patient is bedridden, orthopnoeic and oedematous in the legs or over the whole body, except the scrotum. Dilatation of both chambers of the heart dominates the clinical picture, with resulting cardiac failure, and enlargement of the liver but no cyanosis.

Treatment consists of rest in bed; a diet of milk (2 pints), bread (12 ozs.), plantains (2); complete withdrawal of rice; strychnin, iron and small doses of salvarsan. Vitamin B is given in the form of toddy (2 ozs.), t.d.s.; meat, eggs, fruit, etc., are added to the diet. In acute cases with cardiac dilatation adrenaline 1 cc. twice a day, and atropine grain 1-100 once a day, are injected. Venesection relieves the dyspnoea. Tincture of digitalis 20 minims, every 4 hours in the first 48 hours, gives very good results. Only fluid diet, with toddy, is allowed.

In the section of the paper dealing with etiology, four different types of diet are given which were consumed by beriberi patients. With one exception, these diets show that the disease can occur when all the essential food principles and vitamins are present. From tables showing the staple articles of diet in the various parts of the district, it is seen that the disease is more common in those places where rice is the staple food. The authors state that under-milled rice is the usual form eaten by the coolies. Nevertheless, the patients responded

rapidly to the administration of vitamin B. The presence of an infection is suggested, and it is thought that the organism lies dormant in the endemic areas during the hot weather, and multiplies during the rainy season. The good results obtained from salvarsan injections suggest the possibility of the organism being a spirochaete.

A. D. Bigland.

JOLLY (G. G.) "**Beriberi**" in **Cheduba Island, Arakan, Burma.**—*Indian Med. Gaz.* 1930. July. Vol. 65. No. 7. pp. 383-386.

Cheduba is a large island off the Arakan coast. Beriberi has long been endemic there, but in 1929 it was unusually prevalent. "During the rainy season of 1929, approximately 1,650 cases with 188 deaths occurred among a population of 32,500. The coastal villages suffered most, those in the interior being comparatively free. The disease is definitely seasonal, its incidence during the rains, July and August, being the months in which most cases develop." At this season, the diet in the coastal villages consists of white rice, an insufficient quantity of salt fish, a few green leaves and bamboo shoots. In the interior, the dietary conditions are very much better, vegetables and fruit being grown. In the coastal villages also, the local toddy made from the Dhani palm is an important article of diet. During June and July, the supply of this commodity practically ceases owing to the sap becoming scanty.

There seems to be little doubt that the disease is due to vitamin B deficiency. In the preventive campaign, it is proposed to include red rice and rice cleanings in the diet, to store legumes for consumption in the germinated form and, possibly, to use toddy yeast as a food.

A. D. B.

DE LOS REYES (J. M.). **Beri-Beri and Avitaminosis.**—*Eighteenth Ann. Rep. Med. Dept. United Fruit Company, Boston, Mass.* 1929. pp. 138-145. With 1 text fig. [United Fruit Co. Hosp., Banos, Cuba.]

Beriberi is endemic in certain districts of Cuba. The disease is apparently associated with vitamin B deficiency; thus the diet consists namely of cheap, over-milled and long-stored rice, beans, in the cooking of which nearly all the vitamin B is removed, and white bread, which is made from super-milled flour. The planting of green vegetables gave most satisfactory results as regards prophylaxis. In spite of this evidence, the author is of the opinion that vitamin B deficiency is not the sole cause. It certainly is remarkable that the cases came almost entirely from one district, where the dietary conditions were similar to those obtaining in other places.

Another finding, somewhat opposed to the avitaminosis theory of beriberi, is the prevalence of eosinophilia in the cases. This ranged from 3-18 per cent., though the stools were relatively free from parasites and skin affections were few.

Notes are given of 36 cases, all Cubans, except one Chinaman and one Spaniard. According to clinical findings, the author has grouped the cases into five categories. *Group 1* (2 cases) in which cardiac symptoms predominated. Both these patients died, the autopsies revealing cardiac hypertrophy and the other usual findings. *Group 2* (19 cases): polyneuritic symptoms predominated. *Group 3*

(1 case): oedema predominating. *Group 4* (6 cases): polyneuritis and oedema were both present. *Group 5* (7 cases) with ill-defined symptoms.

Treatment consisted in giving a diet rich in vitamin B and free from rice and refined cereal carbohydrates. Massage and nux vomica were found helpful in the paraplegic types. Yeast gave only indifferent results.

A. D. B.

AYKROYD (W. R.). *Beriberi and Other Food-Deficiency Diseases in Newfoundland and Labrador.*—*Jl. Hygiene*. 1930. Aug. Vol. 30. No. 3. pp. 357–386. With 4 charts in text. [33 refs.] [Lister Inst., London.]

At the beginning of this century, beriberi first became common on the Newfoundland coast. The disease has been endemic since, but in the last decade it has become less frequent and seems to be disappearing. The author gives the following summary of his paper:—

" 1. Beriberi occurring on a white-flour staple is similar to that occurring on a rice staple.

" 2. Under the difficult climatic conditions of North Newfoundland and Labrador, families are obliged to buy food stores in November or December to last until the following May or June. When poverty prevents a sufficient variety of foodstuffs, and calories are the foremost consideration, white flour with few extras forms the main dietary and beriberi tends to occur in April, May or June. It occurs in families who have grown few vegetables and shot little game.

" 3. The disease attacks more men than women, and very rarely children between the ages of infancy and puberty. The age and sex incidences of beriberi are difficult of explanation and differ in different countries.

" 4. Infantile beriberi probably occurs in Newfoundland and Labrador, but is largely unrecognised.

" 5. The main cause of beriberi is vitamin B₁ deficiency, but the diets of patients suffering from beriberi are deficient in other respects.

" 6. It is suggested that the infrequency of wet Beriberi in Newfoundland may be due to the fact that wheat flour has a higher protein content than polished rice.

" 7. Since poverty and deficiency disease are rigidly associated, prevention is an economic rather than a medical problem.

" 8. Severe scurvy and rickets are not often met.

" 9. Functional hemeralopia or night blindness occurs mainly during the summer among men. It occurs on a diet deficient in vitamin A, and is rapidly curable by vitamin A containing foods, a fact well known to the Newfoundlanders. The disease may occur in men taking a deficient diet for less than one month. Other evidences of vitamin A deficiency are lacking.

" 10. Tuberculosis, severe dental caries, functional stomach complaints and constipation are common. Gastric and duodenal ulcer, diabetes and obesity are rare."

A. D. B.

VIANNA (Miguelote) & PEDRO (Antonio). *Etudes sur l'étiologie du kakké ou beriberi.* [*Aetiology of Beriberi.*]—*C.R. Soc. Biol.* 1930. Oct. 16. Vol. 105. No. 27. pp. 105–107. [Bios Inst., Nictheroy, Brazil.]

In February 1930 six cases of beriberi occurred among prisoners at Nictheroy, Brazil. In only one of these cases was the *Bacillus Kakké* of

Matsumura isolated from the stool. The only difference between this organism and *Escherichia Coli* is that the former ferments saccharose. The patient's serum agglutinated the organism isolated from the stool up to a titre of 1 in 400, and the communior up to 1 in 100. The serum of another beriberi case gave a titre of 1 in 100 with the *Bacillus Kakké* but no agglutination with communior. In two other cases, there was an agglutination figure of 1 in 80 with communior, and no reaction with *B. Kakké*. The serum of the last two cases showed no agglutination reactions with either organism.

To study the part played by starvation in predisposing to this infection, the authors fed two pigeons on a polished rice diet. Both birds died of typical avian polyneuritis, and from the rectal contents of each was isolated an organism similar to the above. Anti-kakké and anti-communior sera were prepared by intravenous injections of rabbits, with increasing doses of the respective organism. The organisms from one pigeon (not used for immunization) and from the human beriberi case were agglutinated by the anti-kakké serum up to a dilution of 1 in 400. The organism from the other pigeon (the one used for immunization) gave a figure of 1 in 500. Absolutely negative results were obtained with *Escherichia communior*. The anti-communior serum only agglutinated the sample used for immunizing (1 in 400) and had no effect upon either of the organisms derived from the pigeons or the human beriberi case.

Thus it would appear that an organism indistinguishable from the *Bacillus* of Matsumura and similar to the *Escherichia communior* (except for serological reactions) was isolated from a case of human beriberi and from two cases of experimental polyneuritis columbarum.

A. D. B.

OHTA (Kohshi). Zur Klinik der Säuglings-Beriberi. [**Symptomatology of Infantile Beriberi.**—*Jahrb. f. Kinderheilk.* 1930. June. Vol. 128. (3 Ser. Vol. 78.) No. 1/2. pp. 1-9. With 4 figs. [Children's Clinic, Izumibashi-Charity-Hosp., Tokyo.]

Infantile beriberi is a disease pre-eminently of breast-fed babies. In the University Children's Clinic at Tokyo only 16 out of 430 such cases were bottle-fed. Males are apparently more liable than females, and the onset is most frequent in the third month of age, and during the period May-October. Statistics show that in two-thirds of the cases the mothers suffered from beriberi during pregnancy or lactation, though the severity of the disease in the mother bears no necessary relation to that in the child.

The disease is ushered in with vomiting and green stools. Later, tachycardia and dyspnoea develop, these being ascribed to dilatation of the right side of the heart, as evidenced by clinical and radiological observations. Oedema occurs either as the result of cardiac failure or spontaneously, and it is interesting to note that it is rarely general in distribution. In the nervous system are to be found peripheral neuritis, affections of the oculo-motor and recurrent laryngeal nerves and a retro-bulbar neuritis.

Treatment consists of (a) attention to the mother's diet during pregnancy and lactation, by adding rice-polishings, and (b) in the case of the infant, by intermitting artificial and breast-feeding, and by the administration of vitamin B preparations.

A. D. B.

OHTA (Kohshi) & IZUMITA (Tomotake). Zur Kenntnis der Funktionsanomalie des Verdauungskanal bei der Säuglings-Beriberi. Erste Mitteilung: Ueber die Form und die motorische Funktion des Magens bei der Säuglings-Beriberi. [**The Form and Motor Function of the Stomach in Infantile Beriberi.**]—*Jahrb. f. Kinderheilk.* 1930. June. Vol. 128. (3 Ser. Vol. 78.) No. 1/2. pp. 10–39. [26 refs.] [Children's Clinic, Izumibashi-Charity-Hosp., Tokyo.]

Vomiting is a common symptom in infantile beriberi, especially in the early stages. The authors have been at considerable pains to discover, if possible, the cause. From radiological examination of the stomach it would appear that there is no characteristic alteration in the shape of this viscus in the disease. By the use of the stomach-tube, however, it was found that there was a very definite delay in emptying of the stomach in these infants. The cause of this delay is far from clear, though much work was done in an effort to elucidate the matter. Thus, it was found that feeding beriberi infants with normal mothers' milk, cows' milk and beriberi mothers' milk, respectively, gave a delayed emptying-time increasing in this order. Further experiments showed that neither the vitamin B nor fat-content of the mothers' milk was at fault in this respect. It is interesting to note that the rapid improvement brought about in these sick children by the intramuscular administration of oryzanin was followed, for the most part, by a corresponding diminution in the gastric delay. By the use of pilocarpine, atropine and adrenalin, in small doses, it would appear that the vegetative nervous control of the stomach may play a part in the symptomatology. A. D. B.

- i. INAWASHIRO (Rokuro) & HAYASAKA (Enaji). **Studies on the Effect of Muscular Exercise in Beri-beri. First Report. The Influences of Muscular Exercise upon the Gas and Carbohydrate Metabolism. (Resynthesis of Lactic Acid, Acidosis and the Entity of Fatigue in Beri-beri.)**—*Tohoku Jl. Experim. Med.* 1928. Dec. 30. Vol. 12. No. 1. pp. 1–28. With 2 text figs. [38 refs.]
- ii. HAYASAKA (Enaji) & INAWASHIRO (Rokuro). **Studies on the Effect of Muscular Exercise in Beri-beri. Second Report. The Influences of Muscular Exercise upon the Circulatory Apparatus, with Special Reference to its Dynamic Function as well as the Utilisation and Supply of Oxygen in Beri-beri. (The Cause of the Hypertrophy and Dilatation of the Heart in Beri-beri and the Relaxation of the Peripheral Blood Vessels.)**—*Ibid.* pp. 29–61. With 4 text figs. [81 refs.]

i. Experiments were undertaken to investigate the metabolism of exercise in beriberi. The following are among the results obtained. In acute stages of the disease the respiratory quotient is raised by muscular action to a fairly normal degree but soon after exercise it falls far below the original value. At the height of the disease an acidosis is present even at rest and this becomes more marked after exercise. A similar change, but in the opposite direction to the above, is found in the lactic acid content of the blood. The resynthesis of lactic acid resulting from exercise is slower than that found in normal subjects. The blood sugar is increased after exercise in acute cases, probably owing to acceleration of adrenalin output. The acidosis in beriberi is partly due to a disturbance of lactic acid resynthesis and partly to a shortage of fixed alkali. The swelling of muscles, especially

in the gastrocnemius, which may occur even at rest, is due to a local acidotic change.

ii. In acute stages of beriberi the "minute volume" (i.e., the volume of blood which flows through the heart per minute) and the "stroke volume" (i.e., the minute volume divided by the pulse rate) are increased during rest, while after exercise the increase is greater still, and returns to the initial value more slowly than normal. "Muscular exercise elevates the maximum blood pressure less and lowers the minimum more in the acme of beriberi than after its recovery." It was found that the rate of oxygen supply through the capillaries into the tissues is lessened in beriberi patients and that oxygen utilization is decreased by exercise. The author suggests that the blood flow increase in the disease is due to relaxation of the peripheral vessels and to increased secretion of adrenalin or similar substances. "Since muscular exercise increases blood flow and acidosis markedly in beriberi, it will accelerate the hypertrophy and dilatation of the heart."

A. D. B.

KEEFER (Chester S.) & HSIEH (C. K.). **The X-Ray Examination of the Heart in Beriberi.**—*Radiology*. 1929. Sept. Vol. 13. No. 3. pp. 211–216. With 6 figs. [7 refs.] [Peking Union Med. College, Peking.]

The roentgenologic study of the heart in beriberi comprised examination by the fluoroscope, and the making of teleoroentgenograms at different levels. The authors summarize their work as follows:—

"(1) The heart was enlarged in all cases of beriberi with cardiac insufficiency.

"(2) There was considerable cardiac enlargement in some patients without cardiac insufficiency.

"(3) The enlargement was principally right-sided, involving both the right auricle and ventricle, and the pulmonary artery was quite prominent in many.

"(4) There was enlargement in the region of the superior vena cava. This shadow diminished with the decrease in the size of the right auricle. The left auricle and ventricle were enlarged to a lesser degree.

"(5) The size and configuration of the heart changed completely following treatment, and assumed a normal size and shape after a varying length of time."

A. D. B.

- i. AALSMEER (W. C.) & KOCH (E.). Bijdrage tot de kliniek der beriberi. 1. De bloeddruk. [**Contribution to the Clinic of Beri-beri. 1. The Blood Pressure.**]—*Geneesk. Tijdschr. v. Nederl.-Indië*. 1930. Apr. 1. Vol. 70. No. 4. pp. 383–393. [1 ref.]
- ii. — & SYLVANUS (D.). Bijdrage tot de kliniek der beri-beri. 2. De vaattoon, vroegsymptoom eener afwijking in de circulatie. [**2. The Vascular Murmur, Early Symptom of Abnormal Circulation.**]—*Ibid.* May 1. No. 5. pp. 425–435. [7 refs.] [Nias Med. Clinic, Soerabaja.]
- iii. —. Bijdrage tot de kliniek der beri-beri. 3. Bloeddruk en vaattoon. Hun onderling verband in het algemeen en hun beteekenis voor beri-beri in het bijzonder. [**3. Blood Pressure and Vascular Murmur. Their Relation in General and their Special Significance for Beriberi.**]—*Ibid.* June 1. No. 6. pp. 535–541. [2 refs.] [Nias Internal Clinic, Soerabaja.]

i. If a vessel murmur is heard above a certain part of an artery the diastolic bloodpressure at this spot is zero. The lowering of the diastolic

pressure in beriberi and especially its rise during recovery are important phenomena in the clinical picture, indicating the stage in which the patient is. The authors distinguish 3 groups of cases: (1) cases without vessel murmurs; (2) cases with a crural, but without a brachial murmur; (3) cases without crural and brachial murmurs. The accompanying motor and sensory nerve symptoms may be of any degree, especially in cases of some duration which have been influenced in their course by some kind of dietetic treatment.

ii. The murmur is usually limited to the larger arteries; if it appears over the smaller arteries it interferes with bloodpressure estimation. In beriberi these difficulties usually arise and other diseases which might cause the same phenomenon (aortic insufficiency, hyperthyroidism) could hardly cause trouble in differential diagnosis. Illustrative cases are quoted.

In beriberi, with the exception of the very serious "shoshin" cases, adequate treatment (rest and diet) causes the murmur to disappear. In other cases the influence of treatment is never so pronounced. The appearance of a murmur, together with lowering of the minimal blood-pressure, marks the beginning of beriberi, long before motor disturbances induce the patient to take rest.

iii. Besides the three cardinal symptoms of beriberi recognized so far (oedema, nervous symptoms and cardiac alteration), a fourth group of vascular symptoms well deserves our attention.

Apart from intercurrent influences these vascular symptoms run the following course:

(a) The heart's action becomes more frequent, the heart sounds louder, and there are marked pulsations of the aorta and the carotids, but no crural murmur. The diastolic blood pressure may be lowered, not by loss of tension of the vessel wall, but by the diminished force of the heart muscle. Generally the pressure is normal; it may even be increased by reaction of the peripheral vessels.

(b) There is a murmur over the crural, but not over the brachial artery. If the diastolic pressure, measured at the brachial artery, is lowered such is caused in the way mentioned under (a).

(c) The bloodpressure decreases by loss of tone of the arteries, and arterioles. As long as any diastolic pressure exists, no vessel murmur is heard. The bloodpressure cannot possibly be increased, and is often lowered.

(d) There is a murmur also over the smaller arteries, the diastolic pressure approaches zero and cannot be measured. In this stage only the systolic pressure diminishes and the patient may die.

W. J. Bais.

CHOPRA (R. N.) & BASU (U. P.). **Cardiovascular Manifestations of Epidemic Dropsy and their Treatment.**—*Indian Med. Gaz.* 1930. Oct. Vol. 65. No. 10. pp. 546-550. [4 refs.]

A large number of cases of epidemic dropsy came under the care of the authors in various Calcutta hospitals during the latter half of 1929, and 19 of these form the material of the present investigation. The age of the patients varied between 6 and 45 years. There were 15 males and 4 females; 14 Hindus, 4 Mahomedans and one an Indian Christian. The symptoms are examined in detail.

(1) *Oedema of the legs.* This is one of the very earliest symptoms. It is due to capillary dilatation and increased transudation. This view is supported by autopsy findings, sections showing enormous increase in vascularity of the subcutaneous fatty tissue. (2) *Diarrhoea.* This, too, is a very common symptom and is due to congestion of the intestinal mucous membrane. Most of the abdominal organs share

in the congestion. (3) *Fever*. Follows absorption of toxic substances from the alimentary tract. Owing to damage to the mucous membrane, the intestinal flora, even, may invade the blood stream. (4) *Palpitation*. The disordered action of the heart is due, firstly, to the action of toxins upon the accelerator mechanism, and secondly, to increased vascularity and oedema of the cardiac muscle. In later stages, the heart is dilated. (5) *Dyspnoea*. This is at first due to toxic action upon the respiratory centre, but later to structural changes in the heart and lungs. (6) *Praecordial pain*. Is usually due to oedema of the cardiac muscle. It may, however, be referred from the alimentary tract. Occasionally, pericarditis is the cause of the pain. (7) *Cardiac Asthma*—probably due to pulmonary oedema. (8) *Cough*—follows congestion of the upper respiratory tract.

In the discussion of physical signs, the cardiovascular system is of the greatest interest. Early in the disease, tachycardia and muffling or reduplication of the mitral first sound are remarked. Later, murmurs of relative incompetence of the mitral valve appear, with dilatation of the left ventricle. The right side of the heart usually shows no enlargement. Sometimes both ventricles dilate simultaneously, with the appearance of a temporary mitral presystolic murmur, probably due to bulging of the intraventricular septum into the right ventricle. Cyanosis and jugular pulsation are notably absent. Congestive cardiac failure does not usually appear as in beriberi. Increased frequency of the pulse rate and sinus arrhythmia are the rule. In the early stages, systolic blood pressure is raised, but this falls with the onset of structural changes in the heart. In epidemic dropsy the E.C.G. shows little more than sinus arrhythmia. Anaemia and more or less generalized oedema are the rule.

In the authors' opinion, the mechanism of production of the above symptoms and signs is as follows:—An infection invades the gastrointestinal tract causing diarrhoea. Later, owing to damage of the mucosa, toxins are absorbed, and these act upon the sympathetic nervous system and the capillaries. The changes in the heart in epidemic dropsy are contrasted with those in beriberi, as described by WENKEBACH [see this *Bulletin*, Vol. 26, p. 517].

Treatment consisted in confining the patients to bed and giving a liberal protein diet, in which wheatbread or chapaties had been substituted for rice. In cardiac failure digitalis is not only ineffective but may be harmful. It should only be used in those comparatively rare cases of right heart failure. Tincture of ephedra (made from the Indian species of ephedra) is a very valuable remedy. If any thyroid deficiency is present, 1 grain of thyroid extract is given, 2 to 3 times a day. When oedema of the lungs occurs venesection should be tried. The authors state that using the above methods of treatment, they did not lose a single patient in the series.

A. D. B.

SHANKS (George). **Pathology of Epidemic Dropsy in Bengal.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1931. Jan. 31. Vol. 24. No. 4. pp. 377-378.

Pathological findings in four fatal cases of epidemic dropsy are discussed. The feature of special interest is a telangiectatic dilatation of the capillaries, most obvious in the fatty tissue whether subcutaneous,

subpericardial or subperitoneal. Similar changes are present in the lungs, beneath the endometrium, in the cervix uteri, in the ovaries, and in the intestines; in fact, wherever the vessels are least supported. Sections show practically no signs of inflammatory reaction and there is little tendency to haemorrhage. Sometimes, however, haemangioma-like nodules appear on the skin and these may rupture and bleed.

A. D. B.

SHAHA (Braja Ballav). **Epidemic Dropsy.**—*Calcutta Med. Jl.* 1930. May. Vol. 24. No. 11. pp. 417–431. [13 refs.]

Successive outbreaks of epidemic dropsy have occurred in Calcutta every decade since 1907, the last severe epidemic being in 1926. The disease is essentially different from beriberi.

During epidemics, various types are encountered. The oedema affects dependent parts and has a peculiarly solid feel, but it pits on pressure. Fever of an intermittent nature, lasting usually not longer than 1 week, is sometimes met with. In addition to a cutaneous rash, another skin condition is sometimes seen:—"Here and there, one finds red dots, varying from the size of a split pea to as big as a small grape, made up of blood vessels in the form of warts . . . they are sometimes sessile, but may be pedunculated; sometimes they bleed. They occur mostly on the lower limbs, but may occur on the trunk, both front and back, and rarely on the abdomen." With recovery from the disease, these "blood warts" disappear. Cardiac failure of a congestive type and diarrhoea, sometime dysenteric, are common. There is no neuritis, and the lost knee jerk, when it occurs, is only due to the inability of the quadriceps to move the heavy water-logged leg. Dimness of vision and glaucoma are sometimes encountered.

The evidence that the disease is in some way associated with rice, is briefly discussed. Some think that the fault lies in throwing away the strained water in which the rice is boiled. This fluid is called Fen and is highly nutritious. A reference to classical literature, however, shows that the practice of discarding Fen was, at any rate, in vogue in 1500. Others blame the faulty storage of rice, but this does not obtain in the villages attacked in the present outbreak (1930). The mustard oil factor is regarded as important by some, but the possibility of an infection being present has certainly many facts to support it. Thus, in 1929, an epidemic raged in the town of Faridpur, during which a young man, finding his legs becoming swollen, returned to his village home. Within a fortnight of his return, 14 members of the family contracted the disease.

Among the more important autopsy findings, may be mentioned the following:—Subserous haemorrhages in the lungs, oedema and congestion of the myocardium, and vascular congestion of the sub-mucosal vessels of the intestine, with denudation of the epithelium in places. The thyroid shows diminution of colloid, and epithelial hyperplasia. The liver presents a nutmeg appearance, the spleen is congested, and the skin shows increased vascularity and oedema with exudation of lymphocytes and endothelial cells. The nervous system reveals no definite change. No characteristic organism could be isolated from the blood, urine, or stools. Blood examinations reveal a secondary anaemia, leucocytosis and eosinophilia. Many biochemical investigations were undertaken, but the results were not particularly noteworthy. It may be mentioned that, in most cases,

the globulin content of the serum was three times the albumin content or more; the normal ratio of albumin to globulin being 3:2.

The author does not agree with the usual therapeutic method of excluding rice and substituting meat and bread in the diet. The treatment is symptomatic, but stress is laid upon the importance of rest. For cardiac failure, digitalis and intravenous injections of glucose are beneficial. In extreme cases of right-heart engorgement venesection should be tried.

A. D. B.

AALSMEER (W. C.). Nieuwe inzichten in de beteekenis van enkele verschijnselen bij de beri-beri.—*Nederl. Tijdschr. v. Geneesk.* 1930. May 24. 74th Year. 1st Half. No. 21. pp. 2640-2650. [4 refs.]

GRATEROL Y MORLES (J.). Contribución al estudio del beriberi.—*Gac. Méd. de Caracas.* 1929. Aug. 15. Vol. 36. No. 15. pp. 221-226.

VEDDER (Edward B.) & FELICIANO (R. T.). An Investigation to determine a Satisfactory Standard for Beri-beri-Preventing Rices.—*Far Eastern Assoc. Trop. Med. Trans. Seventh Congress, British India, 1927.* Vol. 3. pp. 375-408. With 8 charts & 2 plates. [7 refs.]

PELLAGRA.

SHELLEY (Horace M.). **Pellagra in Nyasaland.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1930. June 30. Vol. 24. No. 1. pp. 9–22. With 4 text figs. (1 map). [8 refs.]

Pellagra is endemic in Nyasaland and is especially prevalent in the Central Prison at Zomba. It was first described by STANNUS in 1910 and later a report was made by Milne TOUGH (1922). "The disease attacks old and young, males and female, strong and weak, and natives of all local tribes." There is a marked seasonal incidence, cases chiefly occurring in August, September and October, and again during January and February. The author is of the opinion that diet is not a very important etiological factor. Referring to the prison diet, he states:—

"When Stannus made his original observations, the staple diet consisted of $1\frac{1}{2}$ lb. of rice per day, with $\frac{1}{2}$ an ounce of salt, occasional green food and fish or meat once fortnightly. He reported 131 cases during the period 1910–1913. In 1914 the diet was revised and improved, and during the year 12 cases occurred. In 1920 the diet was further modified and improved, and no cases were reported during the year, but in 1922, the prisoners still enjoying exactly the same diet, 41 cases occurred, and in 1923 another 41 cases were reported. In 1924 the rations were again modified, but 137 cases, with four deaths, resulted. In 1925, 63 cases occurred; 1926, only 7 cases; 1927, 30 cases; and 1928, 48 cases."

Milne TOUGH, in 1922, carried out dietetic experiments and found that the addition of $\frac{1}{2}$ lb. of fresh meat daily did not increase the rate of recovery. The prison and lunatic asylum received exactly the same diet, but in the former prisoners are herded together in one cell, while in the latter institution this is not the case. Pellagra is not so common in the asylum as in the prison.

In the pathological and clinical sections of the paper stress is laid upon the atrophy and fibrosis of the thyroid gland and the myxoedematous appearance of some of the cases. The distribution and symmetry of the dermatitis suggest a nerve root origin of the condition. Pellagra can be either acute or chronic, the latter being sub-divided into the following types: subthyroid, gastro-intestinal, paralytic and mental.

Therapeutically great benefit results from giving 2 grains of dried thyroid extract, and in a group of over 100 pellagrins, treated by thyroid tablets during 1924, only 8 showed recurrence in the following year [see also this *Bulletin*, Vol. 23, p. 685].

A. D. Bigland.

MCKENZIE (A.). **Pellagra in Nyasaland.** [Correspondence.]—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1930. Nov. 25. Vol. 24. No. 3. pp. 360–361.

The writer contrasts his recent experience of pellagra in Tanganyika, with that of Dr. H. M. SHELLEY in Nyasaland. The disease is rare in the former territory, only one case being recorded between 1919 and 1928. During the first quarter of 1930, four cases occurred in a local jail. The periods of confinement before the rash appeared varied between one and five months.

Regarding the prison diet, the writer states:—

"The daily ration of these prisoners was whole maize, 2 lb. ; beans 5 oz. ; oil or ghee $\frac{1}{4}$ oz. ; salt $\frac{1}{4}$ oz. Two lemons per week were also allowed. I attempted to revise the diet to bring it more into line with what was customary outside. Meat here, however, is scarce, and unless a native is wealthy, is not regularly eaten. Spinach and green vegetable are used to flavour the staple diet of maize, while *pombe*, a beer made from millet, is much drunk. Accordingly, for the whole jail, I added to the ration 4 oz. of spinach and 1 oz. of dry yeast per day. To two of the pellagrins only I gave 6 oz. of meat per day."

In six weeks, the two pellagrins who received the meat ration were cured. Of the other two, one's condition had grown worse up to discharge (he was then lost sight of), while the other, on regaining his freedom, bought meat for himself, and in about three weeks he was well. It was noted that protection of the skin from the sun caused the rash to disappear. Since the issue of the spinach and yeast ration, no further cases have appeared in the jail. Meat was both preventive and curative, but yeast seemed to be of use only as a preventive.

A. D. B.

YANG (C. S.) & HU (C. K.). **The Relation of Pellagra to Enteric Disease. Report of Three Cases.**—*Nat. Med. Jl. China*. 1930. Oct. Vol. 16. No. 5. pp. 625–632. With 3 figs. on 2 plates. [18 refs.] [Peiping Union Med. College, Peking.]

Many cases of pellagra following organic disease of the gastrointestinal tract have been recorded. Pellagra is a rare disease in China (only 10 cases have been reported in detail) and the authors record three cases. In two, pellagra was associated with dysentery, and in one, with tuberculosis of the intestine.

Case 1—male—aged 42—vegetarian.—He was admitted to hospital after having had diarrhoea for one year (the condition started with acute dysentery). Six months after the commencement of the diarrhoea, a rash appeared. On examination, the case proved to be typical pellagra with signs of nervous involvement of the legs and anaemia. A diet of eggs, meat, milk and tomato juice brought considerable improvement.

Case 2—female—aged 14—suffering from tuberculosis of the lungs, glands and intestine. The diet was poor, consisting chiefly of cereals. About two weeks after the onset of diarrhoea, the skin lesions of pellagra appeared.

Case 3—male—aged 24.—The patient lived on a diet of corn, wheat, millet, green and salted vegetables. Meat and eggs were not obtainable. He was admitted as a case of amoebic dysentery of over three years' duration. Cutaneous lesions were first noticed about two years and eight months after the onset of diarrhoea. Anti-dysenteric treatment with the addition of milk and tomato juice caused considerable improvement, but later the patient died of peritonitis, following rupture of one of the intestinal ulcers.

These three cases show that pellagra may follow lesions causing chronic diarrhoea, with associated interference with digestion and absorption, especially when the patient has been living upon a defective diet.

A. D. B.

TAKAHASHI (Sh.), ISHIKAWA (K.), OGAWA (Sh.) & IDA (T.). Pellagra und Pseudopellagra in Hokkaido. [**Pellagra and Pseudo-Pellagra in Hokkaido.**—*Japanese Jl. Dermat. & Urol.* 1929. Oct. Vol. 29. No. 10. pp. 65–67. [Dermat.-Urol. Clinic, & I & II Med. Clinics, Imperial Univ., Hokkaido.]

The authors state that over 70 cases of pellagra have been recorded in Japan. From Hokkaido 4 cases are here reported.

Case 1—female—aged 54.—Following medical advice she lived on a light diet for three years previous to the appearance of the cutaneous symptoms of pellagra. The case was a typical one and was markedly improved by vitamin B therapy (beriberol).

Case 2—female—aged 45.—Pellagra developed associated with carcinoma of the pylorus. The symptoms of the former condition were improved by giving vitamin B in the form of wheat extract.

Case 3—male—aged 43.—All his life was liable to gastric disturbances. In this case both cutaneous and nervous manifestations were prominent. He improved rapidly with beriberol and oryzanin.

Case 4—female—aged 41.—Pellagra developed after prolonged gastrointestinal trouble, complicated by under nourishment, due to an edentulous condition. Improvement accompanied the administration of vitamin B.

In all the above cases various haematological and biochemical tests were carried out, but there was nothing unusual in the findings.

A. D. B.

GEORGI (F.) & BEYER (A.). Zur Klinik und Genese der Pellagra. [**Etiology and Pathogenesis of Pellagra.**—*Monatsschr. f. Psychiatrie u. Neurol.* 1930. Aug. Vol. 76. No. 5/6. pp. 296–355. With 6 text figs., 1 folding chart & 2 coloured plates. [32 refs.] [Psychiat. & Nerve Clinic, Univ., Breslau.]

Pellagra is on the increase in Germany since the War. The authors describe 13 cases (one in great detail) which were seen in their clinic in Breslau. The first case is that of a young girl who had been under observation previously for mental symptoms, associated with (?) early organic nerve disease and epileptiform attacks. It is interesting to note that typical pellagra symptoms occurred after the onset of the mental condition, and the opinion is given that the latter was, in reality, the earliest manifestation of the former. The case ended fatally after two years' duration.

The next five cases were similar in most respects to the above, in that what is regarded as a pellagra psychosis ushered in the clinical picture. In two further cases it was doubtful whether the initial mental symptoms were really pellagrous or not. The remaining five cases, though again the mental symptoms constituted the first abnormality noticed, are certainly to be regarded as merely cases of pellagra supervening upon a schizophrenic mental state.

[This is a truly enormous paper, but from the point of view of pellagra research there is little, save the above, to note.]

A. D. B.

MUNFORD (S. A.). **Pellagra, incident to Reduction Diet.**—*Clifton Med. Bull.* 1930. July. Vol. 16. No. 3. pp. 113–115.

In the U.S.A. pellagra is rare north of the Potomac and Ohio rivers. Three cases are here recorded, of which one subject lived in Delaware, and two in New York.

Case 1—female—aged 38—admitted to hospital in a stuporose condition on June 18th, 1925. The history was that following the dictates of a faddist cult, she lived on a diet of raw carrots, raw beets, artichokes, alligator pears, celery, lettuce, grapefruit and crackers. "After four months of this, another cut was made and the total permitted in a day was two leaves of lettuce, one stalk of celery, and two crackers in the morning, and again in the evening." After about two months of this diet, she developed dermatitis (resembling sunburn) on the hands, fore-arms, and round the mouth, together with diarrhoea and mental apathy. Her weight was 110 lbs., and a secondary anaemia was present. At first she was forcibly fed, but later took food well, and by September 6th, 1925, was perfectly well and was discharged from hospital. In June, 1926, she weighed 170 lbs.

A. D. B.

REED (Alfred C.). **Pellagra. Four Case Reports from San Francisco.**—*Amer. J. Trop. Med.* 1930. Sept. Vol. 10. No. 5. pp. 335–343. [Pacific Inst. of Trop. Med., Univ. of California, San Francisco.]

Pellagra occurs sporadically in California, but many cases in the State are imported. Thus for the years 1919 to 1927 inclusive, the incidence figures were 0, 16, 21, 32, 42, 38, 63, 58, 45 respectively. HEIN and MERRILL remark upon the predisposing influence of alcohol and gastro-intestinal disease and upon the fact that the majority of the cases are Irish.

The etiology, pathology, prognosis, diagnosis and treatment are discussed. Under the last heading, liver or liver extract is mentioned as being worthy of trial. Four cases are described in detail, but a brief summary of three will suffice.

Case 2—female—Mexican—aged 49.—Has lived for 19 years in San Francisco. About a year ago following removal of teeth and tonsils, diarrhoea began followed by a typical dermatitis later. All the usual findings were present, but vaginitis and vulvitis were troublesome features. Treatment consisted in giving a high protein diet and cacodylate intravenously. Later, Harris yeast extract tablets were exhibited. Two months after admission to hospital, her condition had returned to normal.

Case 3—male—aged 70—White.—Symptoms began about two months ago, with diarrhoea, dermatitis and sore tongue. For the last three or four years he has been a beggar, and his diet has consisted chiefly of doughnuts, coffee and soup. Clinically, he presented a typical picture of pellagra. After being on a high protein diet for a month, the dermatitis had almost disappeared and his dementia was considerably improved.

Case 4—male—native of Peru—aged 58.—For a "long time" his diet had consisted solely of macaroni, rice and baked beans. He had lived in San Francisco for 38 years, and about four months previous to admission to hospital, his present illness began with diarrhoea and paraesthesiae. The case was typical, but was complicated by syphilis. Anti-luetic treatment, with high protein diet and yeast, brought about a gradual improvement in his condition.

A. D. B.

SWARUP (Anand). **A Case of Pellagra.**—*Indian Med. Gaz.* 1930. Aug. Vol. 65. No. 8. pp. 440–441. With 1 text fig.

Pellagra is a comparatively rare disease in India. The present case came from the Ballia District of the United Provinces. The patient, a native,

male, age 31, was admitted to the District Hospital in February 1930. There was a history of dermatitis and stomatitis, occurring in the spring, and on one occasion an attack of diarrhoea. On admission, the face, hands, arms, legs and feet showed a fairly characteristic dermatitis, a not quite typical glossitis, and erosions at the angles of the mouth. The appetite was good and the bowels were normal. A definite tremor of the tongue was present, and the patient complained of sleeplessness, vertigo, and vague pains all over the body. Maize was eaten on only rare occasions, and it was unusual for him to take fish or meat. For a time, the exhibition of Fowler's solution seemed of benefit.

A. D. B.

LENGSFELD (W.). Ein Fall von Pellagra beim Kind. [**Pellagra in a Child.**]—*Jahrb. f. Kinderheilk.* 1930. Mar. Vol. 127. (3rd Ser. Vol. 77.) No. 1/2. pp. 69–82. With 1 coloured plate. [15 refs.] [Children's Clinic, Univ., Breslau.]

A case of pellagra is described in a child of six from Silesia. For some time the patient had lived upon a protein-poor diet and since the age of two had suffered from the effects of malnutrition. From the photographs the case appears to be a typical one of pellagra. In spite of temporary improvement on a regulated diet, the child fell a victim to an intercurrent infection and died. As evidence of the presence of an avitaminosis, it is interesting to note that keratomalacia was present just before death.

A. D. B.

JAENSCH (P. A.). Augenerkrankungen und Pellagra. [**Eye Diseases and Pellagra.**]—*Monatsschr. f. Psychiatrie u. Neurol.* 1930. Aug. Vol. 76. No. 5/6. [pp. 355–363. [11 refs.] [Univ. Eye Clinic, Breslau.]

An historical survey of the subject reveals that many eye conditions are met with in cases of pellagra, but there is little, if anything, to show that there is any connexion.

The author had the opportunity of examining the pellagrins described by GEORGI and BEYER (see above). Of this series, four only showed alterations in the eye, though a very slight conjunctivitis was noticed in some. The four eye conditions found were glaucoma, pallor of the optic discs, retrobulbar neuritis, with central scotoma, and (?) early optic neuritis. Even here, however, the author cannot positively assert that there is any direct connexion between these eye conditions and pellagra.

A. D. B.

GREER (Alvis E.). **Pellagra-like Skin Lesions due to the Ketogenic Diet.**—*Jl. Amer. Med. Assoc.* 1930. Sept. 20. Vol. 95. No. 12. p. 863. [9 refs.] [Greer-Park Clinic, Houston, Texas.]

The patient, a female, aged 33, was a sufferer from idiopathic epilepsy. On July 17th, 1929, she was placed upon a ketogenic diet, in addition to phenobarbital and bromide. She received protein 36 gm., carbohydrate 36 gm. and fat 238 gm. per diem, given in the form of oatmeal, cream, butter, mayonnaise, 5 per cent. vegetables, 10 per cent. fruits and bacon. On this diet, the patient developed ketosis and her condition improved markedly, but, on October 25th 1929, a pellagra eruption and sore tongue appeared. In spite of this she still continued with the diet and the dermatitis persisted. On December 3rd one drachm of brewers' yeast was given with no other dietary alteration. After two weeks the skin symptoms had practically disappeared.

The author is of the opinion that care should be taken to ensure that patients upon a ketogenic diet receive a more liberal protein allowance than the usual 1 gm. per kilogram of body weight. He agrees with McQUARRIE that 1.75–2 gm. of protein is probably necessary. The patient here considered received an amount a little less than .8 gm. of protein per kilogram of body weight. The pellagra-like skin symptoms were thought to be due to the protein deficiency.

A. D. B.

GUTHRIE (Riley H.). **Pellagra-like Skin Lesions appearing in the Course of a Ketogenic Diet.**—*Jl. Amer. Med. Assoc.* 1930. Dec. 20. Vol. 95. No. 25. pp. 1912–1913.

This case is almost identical with that described by Dr. GREER (see above).

The patient, a single woman aged 30, had suffered from epilepsy for some years. Treatment proving unsuccessful, she was placed upon a ketogenic diet with a very low protein content, relatively liberal carbohydrate, and a high fat allowance. Large doses of phenobarbital were also given. After 7 months of this diet the patient developed a pellagra-like dermatitis on the hands and neck. Various nervous symptoms were present, but these may have been due to the phenobarbital. The skin manifestations began to subside as soon as the diet restrictions were removed.

A. D. B.

SUSMAN (William). **Morbid Anatomy and Histology of Pellagra.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1930. June 30. Vol. 24. No. 1. pp. 23–28. With 8 figs. on 4 plates. [8 refs.] [Path. Dept., Victoria Univ., Manchester.]

A certain number of observers have, for some time, held the view that pellagra is associated with an endocrine disturbance. WATSON, in 1925, showed that the degeneration in the cortical cells of pellagrins was similar to that occurring in cases of myxoedema, and ROAF (1920) found atrophy of the suprarenals in some cases. The present paper deals with the morbid anatomy and histology of pellagra, particularly from this point of view. Six cases (2 sub-acute and 4 chronic) were examined. The author was allowed also to investigate sections of 17 other cases, and the findings agreed with his own.

In the alimentary tract, atrophy and often catarrhal changes were found. The liver in 3 chronic cases showed fibrosis with areas of degeneration and round cell infiltration. (Of the 2 sub-acute cases, one was practically normal and the other presented marked fatty infiltration.) The pancreas, in all six cases, showed acinar atrophy, and almost total absence of zymogen granules; in several, there was hyperplasia of the reticular endothelium, and in nearly all, the islets were abundant, with haemorrhages in some. The pars nervosa of the pituitary gland in three of the four cases was the seat of haemorrhages, and in one case there was an adenoma of the pars anterior. The spleen showed hyperplasia and congestion.

While the parathyroids (one case) showed no abnormality, very definite changes were found in the thyroid gland. In the four chronic cases there was pronounced fibrosis, with progressive obliteration of the vesicles. Round-cell infiltration was slight. Of the two sub-acute cases, one presented a gland almost entirely composed of spheroidal cell masses with some fibrosis, and scarcely any vesicles, and the other showed a similar condition with masses of very large cells. In both, the glands had been completely disorganized.

In all (five cases) the suprarenals had a scanty, or absent, lipoid and in the cortex there were disorganization, scars and regenerated nodules. The medulla, however, appeared normal.

In two chronic cases, the kidneys showed general fibrosis with, in one, intra- and peri-tubal masses resembling calcified material, and in the other, with multinucleated cells in or around the tubules. The sub-acute cases presented swelling of the glomeruli, atrophy of the tubules and some regeneration.

The skin sections showed loss of epidermis in parts with absence of malpighian papillae, thickening of the keratinized layer, and round celled infiltration in some cases. There was evidence of degeneration in various tracts of the spinal cord, and in the brain the cortical pyramidal cells, the Purkinjé cells and ganglion cells of the mid-brain showed acute degeneration, together with gliosis and a deposit of perivascular pigment.

The author stresses the abnormality of the thyroid in every case, and the appearances suggest not an inflammatory process of ordinary type, but the presence of a toxin, or toxin-producing organism, of a low grade of virulence. "The process suggested is a primary disturbance in the thyroid, which gives rise on the one hand to a disturbed digestive mechanism, and on the other hand to a maladjustment of the endocrines, and also, of the liver from its glycogenic aspect. The endogenous toxins so liberated can account for the lesions in the kidneys, the skin, and the central nervous system."

There is some evidence to show that a minute anaerobic organism, described by the author in 1927, may be the cause of the above lesions. [See this *Bulletin*, Vol. 24, p. 808]. It is doubtful whether dietetic causes alone can be responsible for the pathological findings in pellagra. Possibly both factors act in conjunction.

The paper is well illustrated with microphotographs.

A. D. B.

GLAUBERSOHN (S. A.) & GOLDENBERG (M. M.). Zur Lehre ueber die Photodermatosen. [*Light Dermatoses.*]*—Dermat. Woch.* 1930. Nov. 1. Vol. 91. No. 44. pp. 1625–1632. With 6 text figs.

There are in the body substances which render the skin sensitive to the action of light; these may be either exogenous or endogenous. The author describes four cases bearing on this subject:—

Case 1—female—aged 34—10 years history of skin eruption appearing in the spring, advancing in the summer, and disappearing in the winter. This eruption was of a papular nature and was noted on the face, hands and forearms. The blood showed some anaemia and, spectroscopically, haematoporphyrin in the serum and erythrocytes. Haematoporphyrin was also discovered in the urine.

Cases 2 and 3—mother and daughter—aged 47 and 16, respectively. The daughter at the age of 11 began to have a papular dermatitis on the face and hands, which has recurred every spring and summer ever since. The mother had a similar condition dating from the age of 16. In neither case was the general health impaired and there was no stomatitis. Haematoporphyrin was not examined for in either case.

A consideration of all the findings in these three cases leads the authors to the conclusion that the condition is one of "summer prurigo," which is briefly contrasted with a case of "eczema solare."

A further case of urticaria solaris is described. The authors claim that the four types of light dermatoses are related ; that one long exposure to sunlight may sensitize the patient permanently ; and that the probable cause of the conditions is the presence of a photodynamic substance, haematoporphyrin or another.

A. D. B.

WILSON (J. Frank). **Arsphenamine in the Treatment of Pellagra : Report of One Hundred Cases.**—*Southern Med. Jl.* 1930. Aug. Vol. 23. No. 8. pp. 758-762. [4 refs.]

This paper is based upon experience gained during the last five years in the Dermatological Department of the Jacksonville City Dispensary, Florida, and in the Out-patient Department of the Duval County Hospital. More than 200 cases of pellagra were treated during this period but, for the present purpose, only 100 are analysed. In order to assess the value of the results, it must be remembered that only ambulatory cases are here recorded, as the more serious ones, being sent to hospital, were lost sight of.

In addition to weekly injections of arsphenamine, tonics were given and instructions as to diet. The poor co-operation of the patients in the matter of diet renders the good result of the injections all the more noteworthy. Equally satisfactory results were obtained whether arsphenamine, neoarsphenamine or sulpharsphenamine were used. The majority of the patients received between two and six doses. The ordinary type of case, as seen by the general practitioner, responded well ; even after the first dose the appetite and digestion improve and the diarrhoea ceases.

In a table showing the result of the treatment in 100 cases, it is seen that 85 per cent. became symptom-free. (The author regards 61 per cent. of this group as "improved," since they were unable to change their surroundings and were therefore liable to recurrence) ; 5 per cent. were unimproved, 5 per cent. died and 5 per cent. were lost sight of. Some of the cases are described in detail, and showed the great benefit derived from arsphenamine. In one family, all the members, children and adults, suffered from pellagra. All received dietary treatment, and all, except the father, received three doses of arsphenamine. In a comparatively short time, all but the father were completely well. The father (who had one injection), and a child (who had no injection) from a neighbouring house, received the same diet as the others, but showed no improvement.

A. D. B.

WHEELER (G. A.). **Black Tongue in Dogs and its Relation to Pellagra in the Human.**—*Jl. Amer. Vet. Med. Assoc.* 1930. July. Vol. 77. No. 1. pp. 62-72.

Canine blacktongue and pellagra are regarded as one and the same disease on account of their seasonal and geographical incidence ; their common cause and similar course ; their identical pathological changes and their equal response to the same therapeutic and preventive measures.

In 1907 CHITTENDEN observed that a dog deprived of meat and milk fell sick with certain definite symptoms and, in 1917, this author, with

UNDERHILL, produced a pathological condition in dogs by feeding them upon boiled peas, cracker meal and cottonseed oil. In both the above experiments there was noted a similarity between these findings and the disease occurring naturally among dogs in the Southern States and known as blacktongue. In experimental blacktongue a scrotal dermatitis appeared in about 50 per cent. of the attacks, a phenomenon which had not been generally noted in the spontaneous disease. It will be remembered that in the experimental production of pellagra in the human subject in the Mississippi State Penitentiary, all the cases showed initial skin lesions on the scrotum. (The other symptoms of blacktongue need not be further detailed, as they have been described previously, this *Bulletin*, Vol. 25, pp. 445, 885-6.)

"It has been found that milk (including buttermilk), fresh lean meats, liver, dried yeast, canned salmon, and wheat germ are highly effective as preventives of both blacktongue and pellagra. Dry skim-milk, tomato-juice, cowpeas, English peas, eggs, canned haddock and whole wheat products furnish somewhat less, but appreciable protection; Soy beans, carrots, and rutabaga turnips furnish very little; and corn products, molasses or sugar, butter, cod-liver oil, cottonseed oil, salt pork, pork fat, sweet potatoes and onions are practically without detectable value as protection against either disease."

The above substances having a fair preventive value have also a favourable therapeutic effect, but the best single substance, in this respect, is pure dried yeast in a daily dose of $\frac{1}{2}$ to 1-oz.; highly satisfactory results being obtained in both diseases. Of course, since both blacktongue and pellagra are the result of faulty diet, this should be corrected immediately.

A. D. B.

GOLDBERGER (Joseph), WHEELER (G. A.), ROGERS (L. M.) & SEBRELL (W. H.). **A Study of the Blacktongue Preventive Value of Lard, Salt Pork, Dried Green Peas, and Canned Haddock.**—*Public Health Rep.* 1930. June 6. Vol. 45. No. 23. pp. 1297-1308. [8 refs.]

This is a continuation of the work in which staple foodstuffs are tested in respect of their potency as preventives of canine blacktongue. The value of this anti-blacktongue factor is assumed to be the same for pellagra. Lard, salt pork and dried green peas are found to be poor sources of this factor, while canned haddock is fairly potent. "Fifty per cent. or more of the test animals on the lard, salt pork and haddock diets showed post-mortem evidence of fatty degeneration of the liver."

A. D. B.

GOLDBERGER (Joseph) & SEBRELL (W. H.). **The Blacktongue Preventive Value of Minot's Liver Extract.**—*Public Health Rep.* 1930. Dec. 12. Vol. 45. No. 50. pp. 3064-3070. [7 refs.]

Dogs fed on a diet consisting of corn meal, cowpeas, casein, cottonseed oil, cod-liver oil and salt mixture develop blacktongue in a period which only occasionally exceeds 53 days. Five dogs on this diet were given liver extract in amount equivalent to 100 grams of fresh liver, and the appearance of blacktongue was prevented for at least 185 days. On discontinuing the liver extract, in three of the dogs symptoms of the disease were noted in 54, 228 and 52 days, respectively.

On the therapeutic side it was found that the same dose of liver extract administered to animals already suffering from blacktongue "caused a recession of symptoms in four out of five dogs and prevented a recurrence, except for possible fleeting signs in two animals, for at least 140 days." It appears, therefore, that liver extract is fairly rich in anti-pellagra vitamin and should prove of value in treatment.

A. D. B.

RODRIGUEZ (José N.). **Pellagra in the Philippines.**—*Jl. Philippine Islands Med. Assoc.* 1930. May. Vol. 10. No. 5. pp. 217-221. With 1 fig. [7 refs.]

A second case of pellagra in the Philippine Islands is here described, the first having been reported by WILLETS in 1910.

A. D. B.

RILLE (J. H.). Die Hauterscheinungen der Pellagra. [**Skin Manifestations in Pellagra.**]—*Dermat. Ztschr.* 1930. June. Vol. 58. No. 5/6. pp. 305-312. [Skin Clinic, Univ., Leipzig.]

This is a clinical lecture given to the Berlin Dermatological Society, and apparently is merely a résumé of the subject without recent original work.

A. D. B.

CARRANCA TRUJILLO (R.). La pelagra como enfermedad de carencia.—*Rev. Méd. Barcelona.* 1929. July. Year 6. Vol. 12. No. 67. pp. 56-59. [2 refs.]

WHEELER (G. A.). The Prevention of Pellagra.—*Southern Med. Jl.* 1930. Apr. Vol. 23. No. 4. pp. 299-304. [17 refs.]

TROPICAL OPHTHALMOLOGY :
A REVIEW OF RECENT ARTICLES.—XV.*

EYELIDS.—SAWHNEY¹ was consulted by a child aged 5 on account of a redness of the eye. Examination showed moderate conjunctival inflammation and a small, hard swelling situated just external to the side of the lachrymal sac. On separating the lids a thorn an inch long was found projecting from a mass of granulation tissue in the neighbourhood of the caruncle. The thorn had been embedded in the tissues for five months, and, despite the position of its free extremity beneath the upper lid, had caused remarkably little pain or inconvenience.

CONJUNCTIVA.—*Trachoma.*—N. Bishop HARMAN² chose trachoma as the subject of his opening address to the Ophthalmological Section of the British Medical Association at Winnipeg. His review of the subject pointed to the fact that the disease now only flourishes in those countries where squalor and bad social conditions exist. The elementary school, which furnishes education in personal hygiene, is the most efficient prophylactic against contagious eye disease. Bishop Harman considers that pannus rarely occurs during the first year of the disease in children, and that it may never appear if efficient treatment is instituted at an early date. He is inclined to the view that the worst end-results are sometimes due more to ill-advised severity of treatment than to the effects of the disease. He states "there is no doubt that if we could keep the children of one generation free from the disease, trachoma would be extinct."

WEISS,³ reviewing existing opinions regarding trachoma, considers the specific nature of NOGUCHI's "*Bacillus granulosis*" still unproved. The aetiological problem presented by the disease is one of the most difficult in the whole field of bacteriology. He discusses the possibility that trachoma may be the local manifestation of a general constitutional derangement. The fact that ophthalmologists disagree about the clinical and pathological definition of the early stages adds to the difficulty. "Evidently it will be impossible to define it properly until the exact etiology, not only of trachoma, but also of those other conjunctival diseases that are being confused with trachoma, is known." The same author⁴ describes the inconclusive results of inoculation of *Bacillus granulosis* made by him on monkeys. TILDEN and TYLER⁵ record their observations on some of the strains of the *Bacillus granulosis* isolated by NOGUCHI in 1926. Some of the animals described in Noguchi's monograph are still alive and continue to show granular

* For the fourteenth of this series see Vol. 27, pp. 1010-1016.

¹ SAWHNEY (M. R.). Report on a Case of a Thorn under the Upper Lid.—*Brit. Jl. Ophthalm.* 1930. Mar. Vol. 14. No. 3. pp. 115-116.

² HARMAN (N. Bishop). Observations on the Control of Trachoma.—*Brit. Med. Jl.* 1930. Sept. 20. pp. 457-460. [17 refs.]

³ WEISS (Charles). Present Knowledge of the Etiology of Trachoma.—*Jl. Infect. Dis.* 1930. Aug. Vol. 47. No. 2. pp. 107-129. [85 refs.] [Med. School, Washington Univ., St. Louis.]

⁴ WEISS (Charles). Studies on *Bacterium granulosis* in Relation to Trachoma: Pathogenicity for Various Monkeys and Apes.—*Proc. Soc. Experim. Biol. & Med.* 1931. Jan. Vol. 28. No. 4. pp. 398-401. [9 refs.] [Med. School, Washington Univ., St. Louis, Mo.]

⁵ TILDEN (E. B.) & TYLER (J. R.). *Bacterium granulosis* in Relation to Trachoma: its Recovery from Experimentally Infected Monkeys and from Human Trachoma.—*Jl. Experim. Med.* 1930. Oct. 1. Vol. 52. No. 4. pp. 617-635. With 5 coloured figs. on 1 plate. [11 refs.] [Rockefeller Inst. for Med. Research, New York.]

lesions. Cultures of Noguchi's strain have been recovered from the monkeys as late as 3 years after inoculation and have reproduced the granular disease in other monkeys. Cultures of the bacteria kept in semi-solid medium containing 10 per cent. rabbit serum ("Leptospira medium") remained viable for many months at room temperature. It is noteworthy that cocaine has a bactericidal effect on the micro-organism. It is suggested that this may explain the negative results reported by some workers.

BEIGLEMAN⁶ advocates tarsectomy in the treatment of trachoma. He claims that it relieves the injurious pressure of the eyelid on the cornea and prevents entropion. It is indicated once corneal complications or entropion have set in; but it should not be performed in the early stages of the disease. The author removes the tarsal plate through an incision made in the skin of the lid.

The *Revue Internationale du Trachome* for October 1930 contains an article by K. OLITSKY⁷ on the relation of the *B. granulosis* to trachoma. The author stresses the following points: (1) That the newly described organism has hitherto only been found in human or in experimental trachoma; (2) that it is capable of producing in monkeys and apes a chronic granular conjunctivitis which closely resembles human trachoma; (3) that material obtained from human trachoma causes a similar disease in these experimental animals, and that the bacterium can be recovered from the monkey so infected; (4) that this experimental conjunctival inflammation differs from the spontaneous folliculosis to which monkeys are subject; (5) that competent ophthalmologists have considered the inoculated disease to be trachoma. An interesting characteristic of the micro-organism is that it is killed in five minutes by a 4 per cent. solution of cocaine.

ADDARIO⁸ succeeded in inducing the disease by inoculating one eye of a blind man with culture of *B. granulosis* obtained from the Rockefeller Institute in New York. The uninoculated eye reacted in eight days time, and trachoma became fully established in both eyes at the end of ten months.

MORAX⁹ records PROCTOR's description of the experimental inoculation of human subjects with *B. granulosis*. Dr. Richards was one of the volunteers and a lady belonging to the Bacteriological Department was another. Transient signs only of the disease were produced. MORAX suggests that persons already blind might volunteer for the inoculation if they knew there was a demand for such subjects.

Another aspect of the disease is reviewed by PASCHEFF.¹⁰ He approaches the question from the anatomical and histological side and describes the various forms of chronic hyperplasia of the conjunctiva met with, viz.: plasma cell, lymphocytic, follicular with many sub-

⁶ BEIGLEMAN (M.). Simple Tarsectomy: its Indications and Technique.—*Amer. J. Ophthalm.* 1930. Aug. Vol. 13. No. 8. pp. 677-680. With 3 text figs. [16 refs.]

⁷ OLITSKY (Peter K.). Relation of *Bacterium granulosis* to Trachoma.—*Rev. Internat. du Trachome*. 1930. Oct. Vol. 7. No. 4. pp. 173-187. [20 refs.] [Rockefeller Inst. for Med. Research, New York.]

⁸ ADDARIO. Sul valore etiologico del *Bacterium granulosis* di Noguchi: trachoma sperimentale.—*Rev. Internat. du Trachome*. 1931. Jan. Vol. 8. No. 1. pp. 14-19. With 2 text figs. French summary.

⁹ MORAX (V.). L'inoculation du *Bacterium granulosis* (Noguchi) à l'homme.—*Rev. Internat. du Trachome*. 1931. Jan. Vol. 8. No. 1. pp. 23-27.

¹⁰ PASCHEFF. Les hyperplasies chroniques de la conjonctive et le vrai trachome.—*Rev. Internat. du Trachome*. 1930. Oct. Vol. 7. No. 4. pp. 189-199. With 1 text fig. [16 refs.]

varieties, papillary and hyaline. He urges the need to unify our conception of the nature of true trachoma. J. SÉDAN¹¹ contributes a paper dealing with phlyctenular disease in trachomatous subjects. He states that trachoma, even in the cicatricial stage, aggravates phlyctenular disease and renders it more resistant to treatment. He has found yellow oxide of mercury ointment to be positively injurious in this type of disease. [It is worth noting that appropriate constitutional treatment directed to cure phlyctenular disease, combined with attention to naso-pharyngeal catarrh and dental sepsis, and with the use of such applications to the eyes as are non-irritating and likely to protect the skin of the eyelids, may sometimes lead to the cure of an apparent trachoma.]

In the issue of January 1931 MORAX¹² describes his observations made during a tour in Algeria which he undertook at the instance of the Anti-Trachoma League. He is convinced of the importance of infantile infection from the mother in the home; indeed, he considers school infection to be a mild factor in comparison. Scholars coming from well-to-do homes seldom contract the disease. Special attention, therefore, should be given to the ophthalmological inspection of mothers and such of their young daughters as have care of infants. Those in charge of schools must be taught the elementary principles concerning the detection and simple treatment of trachoma; and schools must be inspected at regular intervals by qualified persons.

Other articles deal with the disease in Tunisia and Indo-China.

LACHRYMAL SAC.—*Dacryocystitis due to Myiasis*.—FALCÃO¹³ reports a case of suppurative dacryocystitis associated with fistula in which the cause was found to be a larva of *Dermatobia cyaniventris*. He dealt with the trouble by enlarging the opening and inserting a small pledget of cotton wool well soaked in hydrogen peroxide. After waiting for two minutes he was able to extract the larva with iris forceps. He reviews other recorded cases of this larval infection.

CORNEA.—*Superficial Punctate Keratitis*.—R. E. WRIGHT¹⁴ has published some further observations on the epidemic which occurred in Madras in recent years. This epidemic reached its highest point in October 1929 and subsided in February 1930. The incubation period seemed to range between one week and thirty-four days. No immunity against a second attack of the disease was acquired. Enlargement of the preauricular gland was found in a small percentage of cases. Dionine in the late stages, and in the early stages atropin with occlusion by a wet pad and bandage, was found the most suitable treatment.

CATARACT.—KIRBY¹⁵ has made an exhaustive study of calcium metabolism in cases of senile cataract. A considerable number of patients (apparently over 130) were examined, and the author was

11 SÉDAN (Jean). De la kératite phlycténulaire chez les trachomateux.—*Rev. Internat. du Trachome*. 1930. Oct. Vol. 7. No. 4. pp. 203-210. [4 refs.]

12 MORAX (V.). L'organisation de la lutte contre le trachome en Algérie.—*Rev. Internat. du Trachome*. 1931. Jan. Vol. 8. No. 1. pp. 1-14. [2 refs.]

13 FALCÃO (Edgard de Cerqueira). Considerações acerca das ophtalmomyiasas determinadas pela "*Dermatobia cyaniventris*"—Macquart—1840.—*Brasil-Médico*. 1929. Sept. 21. Vol. 43. No. 38. pp. 1134-1138. [10 refs.]

14 WRIGHT (R. E.). Superficial Punctate Keratitis.—*Brit. Jl. Ophthalm.* 1930. Vol. 14. No. 11. pp. 595-601. With 1 chart in text.

15 KIRBY. A Study of Calcium in Relation to Cataract.—*Trans. Amer. Acad. Ophthalm. & Oto-Laryngology*. 1930. Pressional Vol. pp. 89-133. [29 refs.]

unable to find any evidence of calcium excess or deficiency in their blood. The administration of parathyroid extract appeared to have no beneficial effect. The general trend of Kirby's investigation suggests that the development of senile cataract is not due to a disturbance of calcium metabolism. [It may be mentioned that some observers in India have remarked that those districts which show an abnormal prevalence of vesical calculus often show an excessive incidence of senile cataract also.]

ELLIOT¹⁶ has recorded his experience of operation for cataract on patients of very advanced age, and has noted how well such patients stand the shock of an operation. He considers that the extraordinary vitality that enabled them to live so far beyond the usual span of life renders them exceptionally good subjects for operation. He has noted that these patients usually have warm hands and feet, indicating an active thermotaxic centre and good circulation. In short, some patients of over 90 years of age are better subjects for cataract extraction than many who are only in the 6th and 7th decades of life.

O'MALLEY,¹⁷ in view of his experience at the Clinic of Mathra Das, pleads for an extended use of the intra-capsular operation by European surgeons. He describes the technique employed at the Clinic. This is practically the same as that advocated by SMITH, but no counter-pressure is employed. The lens is in every case "tumbled." If difficulty is found in delivery the writer considers it better to rupture the capsule rather than to use counter-pressure. He was able to show a very small percentage of vitreous loss, namely 3 in 220 operations.

WRIGHT¹⁸ regards O'Brien's method of inducing paresis of the orbicularis, by injecting novocaine and adrenalin in the neighbourhood of the temporomandibular joint (*vide* this *Bulletin*, Vol. 27, No. 6, p. 504) as the best so far devised for this purpose.

GLAUCOMA.—WRIGHT and Koman NAYAR¹⁹ report four cases of buphthalmos in brothers varying in age from 15 to 26 years. Two of these had been trephined in one eye some four years previously. The sight of the trephined eyes had been preserved whilst the unoperated eyes had deteriorated. They consider that trephining affords a better prospect in this class of case than any other form of treatment.

GENERAL.—MOORE²⁰ has noted an *amblyopic condition in school children* which he attributes to a defect of some food factor in the diet. The fields of vision are nearly normal except for a slight contraction of the temporal field. No scotoma was noted. In one case there appeared to be a definite neuritis, but there were practically no other objective signs except some slight corneal changes.

¹⁶ ELLIOT (R. H.). Cataract Operation in Extreme Old Age.—*Brit. Med. J.* 1931. Jan. 24. pp. 132-133.

¹⁷ O'MALLEY (C. Conor). Intra-Capsular Cataract Extraction at Moga, Punjab.—*Brit. J. Ophthalm.* 1931. Mar. Vol. 15. No. 3. pp. 153-160. [4 refs.]

¹⁸ WRIGHT (R. E.). Akinesia during Extraction of Cataract.—*Arch. Ophthalmology.* 1929. Dec. N.S.2. Vol. 2. p. 691. [2 refs.]

¹⁹ WRIGHT (R. E.) & NAYAR (K. Koman). Trephining in the Treatment of Congenital Glaucoma.—*Brit. J. Ophthalm.* 1931. Mar. Vol. 15. No. 3. pp. 166-170.

²⁰ MOORE (D. G. F.). Partial Loss of Central Acuity of Vision for Reading and for Distance in School Children and its Possible Association with Food Deficiency.—*West African Med. J.* Lagos. 1930. Oct. Vol. 4. No. 2. pp. 46-48.

WRIGHT²¹ has found the application of a wire snare to the globe to be a useful addition to the *technique of enucleation* when it is desired to perform any modification of Mules' operation. After the globe has been carefully cleaned the snare is applied and the tissue pedicle is cut through by tightening the wire. The procedure renders complete the exposure of a clean and dry Tenon's capsule.

Anaesthesia.—MORGAN and LEES²² report their experience of Avertin. This drug is tribromethyl alcohol, which forms with distilled water a relatively stable solution of about 3 per cent. at a temperature between 35° and 40° C. If heated beyond 40° it decomposes and becomes highly irritant as hydrobromic acid is split off and dibromacetaldehyde is produced. The dosage works out to between 0·06 and 0·09 grams per kilo of body weight. Highly excitable or bull-necked patients require a larger proportionate dose than phlegmatic or spare subjects. The procedure adopted was that suggested by Messrs. Bayer in their hand-book. One hour before operation an injection of morphia and atropin is given. [It is probably wiser to omit the morphia as avertin has a depressing effect upon the respiratory centre.] Half an hour before operation the calculated amount of avertin is given by rectal tube. *The temperature of this solution must not exceed 40° C.* Immediately before injection this solution is tested by the addition of 2 drops of 1-1,000 congo red solution to 5 cc. of the avertin solution. Any blue colouration shows decomposition, and the solution must be discarded. The injection occupies 5 to 10 minutes. Should this injection be returned, it must not be repeated for at least four hours, since absorption of the drug is very rapid. Narcosis usually lasts from 1½ to 2 hours. Absolute amnesia follows, and this secures an absence of mental anxiety and consequent shock. Deficient function of the kidneys or of the liver contraindicates the drug.

SHETTI²³ has described the conditions found at Bijapur eye hospital in the Bombay Presidency, and the methods of treatment in vogue at the Institution. Keratomalacia is a common trouble; instillations of cod-liver oil are given in addition to the usual treatment. Cataract extraction is performed either with or without capsulotomy according to the type of case; the outer canthus is usually divided in order to lessen the danger of squeezing. Intravenous injections of iodine are much used in the treatment of diseases of the retina and optic nerve. The solution injected is half a grain of potassium iodide and half a grain of iodine in 10 cc. of distilled water. A total of six injections is administered, an interval of three or four days being left between each injection.

Quinine Amblyopia.—DUGGAN and NANAVATI²⁴ report two cases of quinine amblyopia. The dosage in each was remarkably small—two and a half grains of the sulphate four times daily for a girl aged nine and two grains thrice daily for a man aged 20; the girl had only taken six doses, but the man had taken the drug for three weeks continuously. Both patients eventually recovered good central vision, but the visual

²¹ WRIGHT (R. E.). The Use of a Snare in Enucleation of the Eyeball.—*Indian Med. Gaz.* 1930. Oct. Vol. 65. No. 10. pp. 550-551.

²² MORGAN (O. Gayer) & LEES (J. M.). Rectal Narcosis in Ophthalmic Surgery.—*Brit. Jl. Ophthalm.* 1930. Nov. Vol. 14. No. 11. pp. 577-582.

²³ SHETTI (E. R.). Notes on the Treatment of Certain Eye Diseases.—*Jl. Trop. Med. & Hyg.* 1930. Oct. 15. Vol. 33. No. 20. pp. 305-306.

²⁴ DUGGAN (J. N.) & NANAVATI (B. P.). Two Cases of Quinine Amblyopia with Unusual Ophthalmoscopic Picture.—*Brit. Jl. Ophthalm.* 1931. Mar. Vol. 15. No. 3. pp. 160-164. [3 refs.]

fields remained contracted concentrically. The treatment adopted was amyl nitrite inhalations, hydrobromic acid, hypodermics of strychnine with the administration of strong coffee and saline purgatives. The malaria was controlled by plasmochin. The authors suggest that in malarious countries some cases of optic atrophy, occurring without obvious cause, may be due to quinine poisoning.

REVIEWS—*The Bulletin of the Ophthalmological Society of Egypt* for 1930 contains many papers which prove the active and progressive nature of the Society. PERETZ²⁵ describes the difficulties met with in operations on the Egyptian for senile cataract. The prevalence of trachoma in Egypt not only causes disappointment on account of corneal troubles, but also adds to the dangers of the operation by contracting the fornices and causing blepharophimosis. Glaucoma, too, is a common complication. BARRADA²⁶ describes a method of dispensing with the use of a speculum by using sutures to separate the lids. MEYERHOF²⁷ discusses a type of deep interstitial keratitis found in trachoma. EL-KATTAN²⁸ describes the histological appearances of corneae obtained from post-mortem room subjects in which the corneae appeared macroscopically healthy. Many of these showed cellular infiltration beneath Bowman's membrane. MASSOUD²⁹ records the result of an investigation regarding the differential leucocyte count in cases of eye disease. He concludes that a high mononuclear count appears to indicate the presence of some toxin acting on the reticular endothelial tissue. This toxin is likely to be particularly dangerous to the eye. In the presence of such a toxin the trauma of an operation might probably suffice to start an inflammatory process in an apparently healthy eye.

The Fourth Annual Report of the Giza Memorial Ophthalmic Laboratory, Cairo,³⁰ for the year 1929 contains much valuable information regarding the problems connected with eye disease in Egypt. The Director (Dr. R. P. WILSON), in reviewing the causes of blindness in the country, states "the need for the urgent collaboration of all to deal with the acute purulent ophthalmias cannot be too strongly emphasized." Slit-lamp examination showed that in the black Soudanese races pigment does not stop short at the limbus, but is lightly distributed throughout the whole of the corneal epithelium. The investigation of trachoma naturally received much attention. The follicular conjunctival inflammation which is so common in monkeys was observed to be free from cicatrization or pannus even over a period of three years. In this condition, too, follicles did not rupture

²⁵ PERETZ (H.). Nouvelle étude des complications préopératoires des yeux atteints de la cataracte en Egypte. Considérations générales et indications pratiques.—*Bull. Ophthalm. Soc. Egypt.* 1930. Vol. 23. pp. 1-7. [6 refs.]

²⁶ BARRADA (M. A.). A Device for separating the Lids in Cataract Operations.—*Bull. Ophthalm. Soc. Egypt.* 1930. Vol. 23. pp. 10-13. With 4 figs. on 2 plates.

²⁷ MEYERHOF (Max). On Interstitial Trachomatous Keratitis.—*Bull. Ophthalm. Soc. Egypt.* 1930. Vol. 23. pp. 17-20. With 1 plate.

²⁸ EL-KATTAN (M. Azmi). Some Observations on Trachoma of the Cornea.—*Bull. Ophthalm. Soc. Egypt.* 1930. Vol. 23. pp. 21-23. With 5 plates.

²⁹ MASSOUD (Farid). The Differential Leucocyte Blood Count in Relation to Diseases of the Eye.—*Bull. Ophthalm. Soc. Egypt.* 1930. Vol. 23. pp. 38-63. [34 refs.]

³⁰ EGYPT: Ministry of the Interior. Department of Public Health. Fourth Annual Report of the Giza Memorial Ophthalmic Laboratory Cairo 1929 [WILSON (Rowland P.), Director].—138 pp. With 16 plates. 1930. Cairo.

spontaneously nor were they found on the tarsal portion of the membrane. Attempts to cultivate the *B. granulosis* from cases of Egyptian trachoma proved negative. An interesting survey of ophthalmic disease in a typical Egyptian village is recorded. This was carried out by Dr. ABDEL LATIF EL-KIRDANI and proved the extraordinary prevalence of conjunctival disease in early childhood. It is believed that children rarely complete the age of two years without having contracted trachoma. Acute gonococcal ophthalmia is chiefly responsible for blindness, but trachoma plays the greatest part in reducing the visual capacity of the people. Primary glaucoma is indeed a more serious cause of blindness than is trachoma. Details of many interesting cases are recorded and the Staff of the Institute and the publishers of the Report deserve much praise for the quality of their work.

H. Kirkpatrick.

MEDICAL ZOOLOGY.

HEGNER (Robert) & CHU (H. J.). **A Survey of Protozoa Parasitic in Plants and Animals of the Philippine Islands.**—*Philippine Jl. Sci.* 1930. Nov. Vol. 43. No. 3. pp. 451-480. With 57 figs. on 5 plates. [35 refs.]

The authors in the Philippine Islands have examined Negritos, monkeys, a *Tarsius lemur*, a flying "lemur," water buffaloes, pigs, dogs, rabbits, guineapigs, rats, civet-cats, bats, 47 species of birds, a turtle, a python, some water-lizards (*Hydrosaurus*), some skink lizards (*Mabuia*), frogs and toads, pond-snails, houseflies, mosquitoes, cockroaches, and 37 species of plants, for parasitic Protozoa, and in their results have incorporated some relevant and useful information from other authors in other parts of the world. The outcome is an interesting and valuable contribution to parasitology from the long tale of which a few items are here selected.

Of thirteen Negritos examined, all were infested with *Entamoeba coli* (also with hookworms), 7 with *Endolimax nana*, and 4 with *Trichomonas hominis*. Among forty-four wild monkeys 10 were infested with *E. histolytica*, 22 with *E. coli*, 37 with *E. gingivalis*, 22 with *Endolimax nana*, 2 with *Dientamoeba fragilis*, 6 with *Giardia lamblia*, 37 with *Trichomonas hominis*, 36 with *T. buccalis*, 2 with *T. vaginalis*, 15 with *Chilomastix mesnili*, and 8 with *Balantidium coli*; small flagellates resembling *Embadomonas*, *Tricercomonas*, and *Hexamitus* were also observed in some of the monkeys and doubtfully *Iodamoeba*, but never *Coccidium* or any blood-parasite. *Balantidium*, either *suis* or *coli*, was found in a wild pig as well as in slaughtered market pigs, and a *Balantidium* probably *haughwouti* in a *Melania* pond-snail. *Giardia* and *Coccidium* occurred in a civet-cat, and *G. canis* in one of 12 dogs. Of 40 bats of various species, insecti- and frugi-vorous, all were free from blood parasites and 2 insectivorous specimens showed *Eimeria* oocysts. Domiciliary cockroaches furnished a rich intestinal fauna—*Entamoeba blattae* and *E. thomsoni*, *Nauphoeta cinerea*, *Rhyporobia maderae*, *Nyctotherus ovalis*, *Hexamitus periplanetae*, *Lophomonas striata* and *L. blattarum*, *Retortamonas orthopterum*. In like manner the parasitic Protozoa of all the other hosts are recorded.

A. Alcock.

HEGNER (Robert) & CHU (H. J.). **A Comparative Study of the Intestinal Protozoa of Wild Monkeys and Man.**—*Amer. Jl. Hyg.* 1930. July. Vol. 12. No. 1. pp. 62-108. With 2 charts in text & 15 figs. on 2 plates. [4 pages of refs.] [School of Hyg. & Public Health, Univ. of the Philippines, Manila.]

A fine comparative study, strictly and explicitly critical, of the intestinal (and vaginal) protozoa of 44 (28 male and 16 female) wild *Macacus philippinensis* monkeys, considered—of course with all commonsense reservations—to have been free from the risks of human contamination to which captive monkeys are exposed. Every one of these monkeys was infested in some sort: one of them held 8 species of protozoa; several of them yielded 6 and 7 species; none had less than 2; the average for the individual monkey was about 4 species. The caecum was found to be the most heavily infested part of the intestine. Besides a number of small flagellates that were not carefully studied, the

following 11 species of protozoa were carefully observed in stained preparations and are here critically considered: *Entamoeba histolytica* in 10 monkeys, the encysted forms, which were not abundant, being for the most part uninucleate; *E. coli* in 22; *E. gingivalis* in 37, a remarkable incidence seeing that only one other reference to amoebae from the monkey's mouth is on record; *Endolimax nana* in 22; *Dientamoeba fragilis* in 2, a species not before discovered in a monkey, 24 per cent. were uninucleate and 76 per cent. binucleate; *Trichomonas hominis* in the large intestine of 37, *T. buccalis*, a species hitherto not recorded from monkeys, in the mouth of 36, and *T. vaginalis* (= *T. macacovaginae* of Hegner and Radcliffe) in 2; *Giardia lamblia* in 8, the trophozoites in the small intestine, particularly the duodenum, the cysts (few observed) in the colon; *Chilomastix mesnili* in 15; and *Balantidium coli* in 8, showing much diversity in size and a remarkable nucleus in which the chromatin is distributed in coarse granules at the intersections of a fibrillar network. There is an ample bibliography and there are two plates of figures and many tables of measurements, etc., and the individual species are debated in their structural characters, their chronological record, and their probable synonymy, so that the authors' specific identifications are well defended.

A. A.

CLARK (Herbert C.). **Progress in the Survey for Blood Parasites of the Wild Monkeys of Panama.**—*Amer. Jl. Trop. Med.* 1931. Jan. Vol. 11. No. 1. pp. 11-20 [3 refs.] [Gorgas Memorial Lab., Panama.]

This is merely a retrospect of 18 months; 210 wild and 43 captive monkeys have been examined for blood parasites.

The table includes 7 species, which are named, and their infections indicated in a general way. Malaria was existent in 4 species; "the parasites closely resemble human quartan and tertian," malaria pigment was observed in others; trypanosomes in 6 species, but seeming to be "little harmful"; microfilariae in 5 species, apparently "an important disease"; spirochaetes in the squirrel-monkey only and generally fatal to the young.

A. A.

MAZZA (Salvador). **Papel de los protozoarios en las apendicitis. [The Rôle of Protozoa in Appendicitis.]**—*Bol. Inst. Clin. Quirúrg.* Buenos Aires. 1930. Vol. 6. No. 46/47. pp. 29-33. [7 refs.] English summary.

[This short paper contains many points of interest.] The author examined 394 appendices immediately after their removal at the Institute of Clinical Surgery. He found parasites (one or more species; in 56 only one) in 63 of them (16.5 per cent.), namely, *Entamoeba* in 14; *Giardia* in 20; *Trichomonas* in 2; and *Blastocystis* in 34. In 6 others Charcot-Leyden crystals were abundant, but no protozoa either in the appendix or the faeces, and the author does not believe that they have any bearing on protozoal infection, in this situation at all events.

In 3 of the 10 with *Entamoeba* alone it was the vegetative form of *E. histolytica* without any cysts; in the other 7 *E. coli* (with cysts in one). In two the appendicular mucosa showed necrotic foci. The author refers to previous records of amoebic appendicitis, notably

HOGAN's case of peritonitis from perforation by amoebae (*Jl. Amer. Med. Assoc.*, 1920, Vol. 75, No. 11, p. 727). *Blastocystis hominis* was met with in 34 specimens; excision had been performed for appendicular pain, with nausea and vomiting; many were normal, some were adherent [possibly from old inflammation independent of *Blastocystis*]; none showed lesions of the mucosa except congestion. All those with *Giardia* had presented definite symptoms of appendicitis. The author notices the abundance of *Trichomonas* (in the only two cases in which it was found). A further point of interest is the relative leucocyte count. In those with *E. histolytica* there was an eosinophilia of 6-7 per cent. and a lymphocytosis of 42-52 per cent., while in the *Blastocystis* patients the lymphocytes were up to 66 per cent. with few eosinophiles, except when *Trichomonas* was also present; under these circumstances there was an eosinophilia of 12.5 per cent.

H. H. S.

SCHILLING (Claus) & SCHRECK (Hans). Bleiben erworbene biologische Eigenschaften pathogener Protozoen bei der Passage durch die natürlichen Ueberträger erhalten?—*Deut. Med. Woch.* 1930. July 11. Vol. 56. No. 28. pp. 1163-1164. [Robert Koch Inst., Berlin.]

— & —. **The Influence of Passage through the Invertebrate Host on the Biological Characters of Parasitic Protozoa.**—*Ann. Trop. Med. & Parasit.* 1930. Oct. 22. Vol. 24. No. 3. pp. 437-442. [Robert Koch Inst., Berlin.]

Starting with the proposition that an animal which has passed the acute stage of a protozoan infection can be superinfected by a serum-fast or relapse strain, but not by the original strain of that infection, the question asked here is what happens to a relapse-strain (and it applies equally to a drug-fast strain) if it passes through the insect that as a rule transmits the correlated disease in nature—does it keep the acquired quality [of serum-fastness] or does it lose it, regaining the qualities of the primary strain? The answer given here is that in the case of *Trypanosoma brucei* and *Glossina morsitans* the passage through the natural transmitter "has a decisive influence on an old laboratory strain (virulence, reactivity to specific antibodies of serum). As this reactivity to antibodies is a characteristic of relapse strains, we may conclude that the passage through the tsetse-fly has changed a relapse strain into an original strain." This answer is based on experiments carried on in Makatumba, a small coral island off Dar-es-Salaam where neither tsetse-flies nor indigenous vertebrates exist. The authors took with them to the island: (1) tsetse-flies (*G. morsitans*) from which they bred the certainly clean flies for experiment; (2) an old laboratory strain of *T. brucei*—here designated Hamburg-Alt strain—possessing high virulence and reactivity to specific antibodies of the serum; and (3) a strain of *T. brucei* originally taken from a wild gnu and afterwards maintained by fly-vertebrate-fly passage—a strain (strain Gnu) much less virulent than Hamburg-Alt. In the island the Hamburg-Alt strain in an infected goat was passed through laboratory-bred flies to other animals, the final issue being labelled Hamburg-recens. "The trypanosomes of strain Gnu behaved in different experiments *in vitro* and *in vivo* exactly like the Hamburg recens trypanosomes," and the authors therefore infer that "the passage through the tsetse-fly has

changed a relapse strain into an original strain." "The fastness of a relapse strain against the serum-antibodies is an acquired quality. It is lost by the passage of the parasite through the insect. So we have an example of mutative loss of an acquired quality: an interesting fact in heredity." [For an interesting contrast to this last conclusion, attention may be drawn to a paper by Miss ROBERTSON (this *Bulletin*, Vol. 27, p. 279) on a specific drug-fastness acquired by *Bodo caudatus* in one medium and maintained through many generations of passage in media devoid of the specific drug.]

A. A.

CARPANO (M.). Infections latentes à hémoprotozoaires. Maladies intercurrentes et récidives. [**Latent Infections with Haemoprotozoa.**]—*Ann. Parasit. Humaine et Comparée*. 1930. Dec. 1. Vol. 8. No. 6. pp. 638–658. With 7 text figs. [17 refs.] [Ministry of Agric., Cairo.]

The author writes as a veterinary pathologist full of experience in tropical and subtropical regions where, in the absence of exact knowledge of the nature of a particular virus, he might have to make use of the blood or serum of a sick or recently convalesced sufferer from the disease, for preventive inoculations. His eye is chiefly on the individuals that although clinically cured of a specific protozoan disease may retain the infection in a latent state for a long time afterwards. Such an individual is not only a hidden reservoir and an insidious disseminator of that infection, but with his latent infection may also—all unsuspected—mask, or complicate, or aggravate the effects of another and different infection subsequently incurred. The possible influence of some prior infection, dormant or otherwise, needs no vindication among medical men. The moral of the author's story is intensified study of animal pathology, and incessant and persevering microscopic examination of the blood.

A. A.

ANDREWS (Justin) & PAULSON (Moses). **The Effect of Barium Sulphate upon the Incidence of Human Intestinal Protozoa.**—*Jl. Lab. & Clin. Med.* 1930. Oct. Vol. 16. No. 1. pp. 39–42. [3 refs.] [School of Hyg. & Public Health, Johns Hopkins Univ. & Johns Hopkins Hosp. & Med. School, Baltimore.]

In a series of 40 persons receiving barium-sulphate preparatory to X-ray examination of the gastrointestinal tract it was observed that the incidence of protozoa in faeces was 13·7 per cent. of those who had *not* received the BaSO₄ within 6 days of preparation and only 8·7 per cent. of those who had. Subsequent experiment *ad hoc* showed that ingestion of BaSO₄ resulted in such a reduction of protozoa per unit-volume of stool that it was frequently impossible to detect any. Amoebae were more obviously affected than flagellates. The decrease was transitory, lasting only as long as BaSO₄ remained in the bowel. The authors think therefore that the mass of Ba salt acts largely by mechanical augmentation or massive "dilution" of the ordinary intestinal contents.

A. A.

CARDAMATIS (J. P.). Méthode de coloration des plasmodes et des protozoaires qui persiste sans changement pendant 25 ans. [**Long-Persisting Stains of Plasmodia and Protozoa.**—*Bull. Soc. Path. Exot.* 1930. Oct. 8 Vol. 23. No. 8. pp. 787-789.]

Description of another slight modification of eosine-methylene-blue staining for protozoa, the chief superiority of which is claimed to be that its effects retain unfading beauty for twenty-five years or more. MM. BRUMPT, NAITAN-LARRIER, and MARCHOUX said that in their respective collections they had many preparations, stained with LAVERAN's eosine-Borrel-blue, which had kept their colour perfectly for 25 years and more.

A. A.

CLEVELAND (L. R.) & COLLIER (Jane). **Various Improvements in the Cultivation of *Entamoeba histolytica*.**—*Amer. Jl. Hyg.* 1930. Nov. Vol. 12. No. 3. pp. 606-613. [9 refs.] [Med. School, Harvard Univ., Boston.]

Numerous media for cultivating *Entamoeba histolytica* employed by various workers are here briefly discussed and the authors specify many that they have used themselves. They state, generally, that in their experience "the best slants are Loeffler's dehydrated serum and liver-infusion agar, and the best liquids are fresh horse-serum saline and 3 per cent. hydrolysed haemoglobin." More particularly they state that "When liver-infusion agar slants are covered with serum saline and a small amount of sterile rice flour is added to each tube, it is possible to start a culture of *Entamoeba histolytica* from a single organism. . . . The amoebae become practically as numerous as blood cells in the bloodstream, and encystation, excystation, and metacystic development occur simultaneously with rapid multiplication of trophozoites." The paper is not one that can be summarized to any useful purpose.

A. A.

BROWNE (Donovan C.). **Effect of Vital Stains on Cultures of *Endamoeba histolytica*.**—*Proc. Soc. Experim. Biol. & Med.* 1930. Dec. Vol. 28. No. 3. pp. 255-257. [1 ref.] [Dept. of Path. & Bact., Tulane Univ., New Orleans.]

Of the water-solutions tried neutral red and Janus green were the two best; both are non-toxic up to 1 per cent. solution; the first stains quickly, the second very slowly; with both the ectoplasm and endoplasm are well differentiated, and the nucleus shows distinctly; Janus blue stains the endoplasm pale pink.

Trypan blue and Nile blue are not well tolerated in solutions above 0.5 per cent.; the first was found "unsatisfactory and not consistent." Brilliant cresol blue "proved unsatisfactory" besides seeming more toxic.

A. A.

DESCHIENS (R.) & GOURVIL (E.). Les entamibes de la bouche des singes. [***Entamoeba of the Monkey's Mouth.***]—*Bull. Soc. Path. Exot.* 1930. July 9. Vol. 23. No. 7. pp. 711-714. With 1 text fig. [5 refs.]

Systematic study of the mouth of 21 monkeys (*Papio sphinx* and *Macacus rhesus*) in the simiary of the Pasteur Institute, has disclosed in

8 cases the presence of *Entamoeba gingivalis* of Gros. Actual comparison precludes doubt, and reciprocal inoculation is confirmative. For convenience, however, the author proposes that the one should be called *E. gingivalis* var. *hominis*, and the other *E. gingivalis* var. *simiae* nov.

A. A.

TAO (S. M.). *Giardia intestinalis* in North China. A Study of 649 Cases.—*Nat. Med. J. China*. 1930. Aug. Vol. 16. No. 4. pp. 347–359. [55 refs.] [National Epidemic Prevention Bureau, Peking.]

This is an analysis of cases of *Giardia intestinalis* infection from the records of the Peiping Union Medical College Hospital for the years 1925 to 1930. Of 12,980 patients examined 649 (5 per cent.) were infected with *Giardia*. (Faecal examinations were made, as circumstances permitted, six times or more in 137 cases, five times in 55 cases, four times in 61 cases, three times in 166 cases, twice in 100 cases, and once in 130 cases.) Of the 649 cases in which the parasite was discovered 475 were in-patients, and 180 were one to fifteen years of age.

Of these 649 cases, 249 were associated with gastro-intestinal symptoms, and 400 were not so associated. Of the 249 gastro-intestinal cases, 87 were "pure" infections of *Giardia* alone and all the others were "mixed" infections.

The phenomena recognized by the author as commonly associated with *Giardia* infection are diarrhoea, dyspepsia, dysentery, abdominal pain or discomfort, and—less commonly—hepato-biliary and duodenal disorder.

In the author's "pure" infections children from one to fifteen years showed 19.59 per cent. of diarrhoea and 23.82 per cent. of dyspepsia, whereas in "mixed" infection the corresponding figures were 10.18 per cent. for diarrhoea and 13.77 per cent. for dyspepsia. Dysentery was a symptom in 13 cases of "pure" infection and also in 13 cases of "mixed" infection. The percentages for dyspepsia, diarrhoea, and dysentery are therefore in young persons much higher in pure infection than in mixed infection, though it must be remembered that diarrhoea is normally common in young children. Most of the patients suffering from abdominal pain and discomfort had a clinical diagnosis of indigestion, or constipation, or appendicitis, or duodenal ulcer, and therefore, in the author's opinion, these symptoms afford no trustworthy aid. In the whole series of 649 cases of *Giardia* infection there were 7 cases of duodenal ulcer and 16 cases of enteritis, "but *Giardia* infection cannot be considered as a factor in their causation as the percentage of such cases is low." Stovarsol in 0.06 gm. doses was given to 8 patients, with success in 6, but in the other 2 parasites were not exterminated even after (in one case) 7 doses.

The author's opinions are hesitating and rather confusing. He admits that his studies show "that *Giardia intestinalis* may be associated with certain gastro-intestinal disturbances" but concludes that "a definite relation between *Giardia* infection and gastro-intestinal symptoms could not be established."

A. A.

- i. TSUCHIYA (H.). **A Comparative Study of Two Diverse Strains of *Giardia lamblia* Stiles, 1915.**—*Amer. Jl. Hyg.* 1930. Sept. Vol. 12. No. 2. pp. 467–491. [26 refs.] With 6 figs.
- ii. — & MIZUSHIMA (H.). **Observations on a Double Mixed Infection of *Giardia lamblia* Stiles, 1915.**—*Ibid.* pp. 492–499. With 5 text figs. [4 refs.]
- iii. —. **A Comparative Study of Trophozoites of *Giardia lamblia* Stiles, 1915, under Varying Conditions.**—*Ibid.* pp. 500–502. [2 refs.] [Johns Hopkins School of Hygiene & Public Health, Baltimore.]

i. The purpose here is to determine whether heritably diverse strains of *Giardia lamblia* exist in man. The history of the subject is reviewed, and then a mass of biometric detail follows, from which the conclusion is formed that two such strains of the species are to be recognized. In strain A the cysts are larger and more elongate-ellipsoid; the trophozoites are more elongate and have the parabasals short, triangular, and transverse; moreover, excystment took place with ease, and trophozoites appeared at the slightest provocation from magnesium sulphate. In strain B the cysts are smaller and more broadly ellipsoid; the trophozoites are shorter and slightly broader and the parabasals are longer, crescentic, and oblique; moreover, no excystment could be effected at any stage of experiment, and repeated and varied provocation was necessary to obtain even a small number of trophozoites.

ii. In "the course of studies on *Giardia lamblia* of two individuals one of us accidentally became infected." There followed an attack of diarrhoea, succeeded by an intense pain at the epigastrium, sensations of hunger soon after eating, nausea, headache, and other symptoms, and the appearance in the stools of *Giardia* cysts of varying dimensions. Study of the cysts showed the presence among them of a strain X, significantly different in length of cysts and in type of frequency distribution from those of strain A or strain B, and calculated to be the result of a mixed infection of A and B.

iii. This is a comparison between the trophozoites of *Giardia lamblia* obtained by duodenal aspiration and those obtained by catharsis and those occurring in normal stools—the last being assumed to be fresh excystments. Those direct from the duodenum are longer and broader than the others, and their coefficients in length and breadth show greater variability. Hence it is argued that the trophozoites achieve their optimum growth in the duodenum.

A. A.

TSUCHIYA (H.) & ANDREWS (Justin). **A Report on a Case of Giardiasis.**—*Amer. Jl. Hyg.* 1930. July. Vol. 12. No. 1. pp. 297–298. [3 refs.] [Johns Hopkins School of Hyg. & Public Health, Baltimore.]

In the course of *G. lamblia* study one of the authors swallowed some cysts. Some time afterwards he suffered "for a few days" from fatigue, premonitory to an attack of diarrhoea succeeded by intense epigastric pain and by feelings of hunger after feeding. The pain lasted for a day, and then intermittently for two days more. All the while there was headache, and spells of nausea and dizziness. There was some lymphocytosis (26 per cent. small lymphocytes) and slight eosinophilia (4 per cent.). A multitude of cysts of *G. lamblia* appeared in the stools. Treatment consisted of two tablets of stovarsol (0.25 gm. each) daily for five consecutive days. On the 3rd day of treatment the symptoms disappeared (except

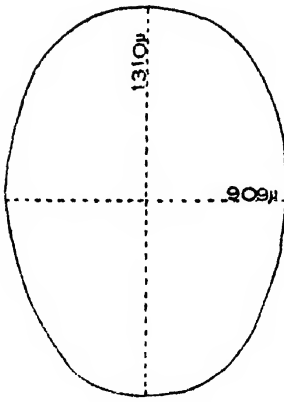


Fig. 1

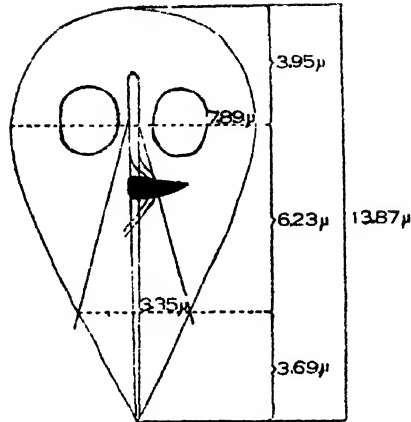


Fig. 2



Fig. 3

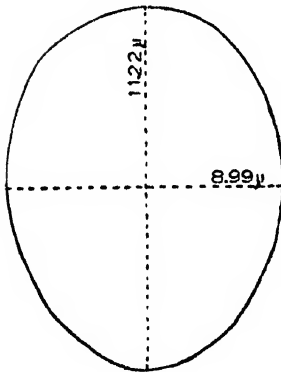


Fig. 4

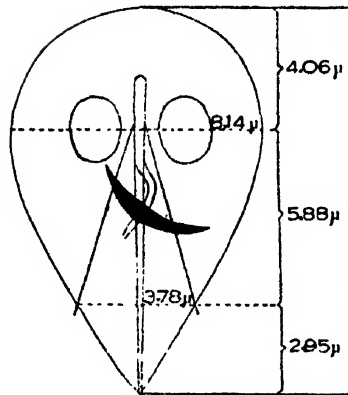


Fig. 5



Fig. 6

Fig. 1. Diagram showing the average length and breadth and shape of 3,600 cysts of strain A of *Giardia lamblia* ($\times 3,600$).

Fig. 2. Diagram showing the average dimensions and shape of 100 trophozoites of strain A of *Giardia lamblia* ($\times 3,600$).

Fig. 3. Diagram showing the number and shape of parabasals of strain A of *Giardia lamblia* ($\times 3,600$).

Fig. 4. Diagram showing the average length and breadth and shape of 2,800 cysts of strain B of *Giardia lamblia* ($\times 3,600$).

Fig. 5. Diagram showing the average dimensions and shape of 100 trophozoites of strain B of *Giardia lamblia* ($\times 3,600$).

Fig. 6. Diagram showing the number and shape of parabasals of strain B of *Giardia lamblia* ($\times 3,600$).

[Reproduced from the *American Journal of Hygiene*.]

for slight epigastric pain after taking stovarsol on an empty stomach), on the fifth day of treatment no cysts were observed in the stool, and on the day after the course of treatment no organisms could be detected in the stools, after purgation. Since the symptoms were known to be concurrent and conterminous with the presence of the cysts and an investigation of the patient's history negated any alternative explanation of the symptoms, the authors conclude that the case is a demonstration of a morbid state caused by *Lamblia* infestation. [The authors do not state the length of the interval between the accidental swallowing of the cysts and the onset either of premonitory symptoms or of diarrhoea and pain.]

A. A.

DESCHIEENS (R.). Recherches sur l'infection des voies biliaires par les lamblies. [**Studies on the Infection of the Biliary Tract by *Lamblia*.**]—*Arch. de l'Appareil Digestif et des Malad. de la Nutrition*. 1930. Oct. Vol. 20. No. 8. pp. 951–957. [18 refs.] [Pasteur Inst., Paris.]

The author accepts as the only consummating evidence of the infestation of the gall-bladder by vegetative forms of *Giardia*, the finding of them there at a surgical removal of the organ (or in animals at an autopsy *ad hoc*). In 12 recorded human cases of giardiasis investigated by the author their presence in the gall-bladder was thus demonstrated only in 3; and in 12 cases in mice autopsied by the author and KIRCHIDZE they were present in the duodenum in every one (and also in the ileum in 6) but were not found in the gall-bladder in any one. The author thus concludes that *Giardia* infestation of the intestine is usual, and of the biliary tract exceptional or rare.

A. A.

FITTIPALDI (C.). Lambliasi intestinale. [**Intestinal Lambliasis.**]—*Riforma Med.* 1930. Dec. 1. Vol. 46. No. 48. pp. 1929–1930. With 1 text fig. [Hosp. for Incurables, Naples.]

A medical man, 32 years old, suffered for four years with diarrhoea and abdominal discomfort and pain; 6–8 actions daily, fluid with flakes of mucus. He was emaciated. Faecal examination revealed many *Lamblia* cysts and a few vegetative forms. Treatment was begun with emetine injections [number and dose not stated] and followed by stovarsol, 50 cgm. daily. Improvement was rapid and to complete the cure thymol was given. The author maintains the pathogenicity of this protozoon.

H. H. S.

GOUREVITSCH (D.). Zur Frage der Pathogenität der Lamblien und Trichomonas bei Kindern und der Therapie mit Myosalvarsan. [**On the Pathogenicity of *Lamblia* and *Trichomonas* in Children, and Treatment by Myosalvarsan.**]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1931. Jan. Vol. 35. No. 1. pp. 26–36. [7 refs.]

From study of what has been written, as from his own observations of cases, the author concludes that *Lamblia* and *Trichomonas* in children are causes of (mostly) gastro-intestinal disorder. For treatment myosalvarsan is recommended, in 0.05 to 0.15 gm. doses once a week for 4 weeks, by intramuscular injection, or 5 per cent. solution of sulphoxyl-salvarsan in 1.5 cc. doses.

A. A.

RODECURT (M.). Ein Jahr Trichomonasfluorbehandlung mit Yatren 105-Pillen. [**A Year's Experience of Yatren 105 Pills in the Treatment of Trichomonas Vaginitis.**—*Med. Klin.* 1930. Aug. 15. Vol. 26. No. 33 (1340). pp. 1228-1229. [1 ref.]

The author has treated 112 cases of this infestation. A "pill" is inserted into the vagina every 2nd or 3rd day, and afterwards at longer intervals; the patient can manage the treatment herself. It is said to be rapidly curative.

A. G. B.

COVENTRY (Frances A.). **The Trypanocidal Action of Specific Antiserums on *Trypanosoma lewisi* in vivo.**—*Amer. Jl. Hyg.* 1930. Sept. Vol. 12. No. 2. pp. 366-380. [27 refs.] [Dept. of Hyg. & Bact., Univ., Chicago.]

The objects of this work were, firstly to study the mechanism of the sudden reduction in the number of trypanosomes which occurs in infections with *T. lewisi* about the tenth day of infection; secondly, to study the mechanism of their final destruction at the end of infection; and thirdly to study *in vivo* the action of immune serum in relation to the occurrence of the zone phenomenon, since destruction of the parasites was found to be associated with a passively transferable parasitocidal property of the serum. The following conclusions were reached as the result of this work:—

"1. A passively transferable trypanocidal substance was demonstrated in serum obtained from rats during the course of uninfluenced infections with *Trypanosoma lewisi*. When tested *in vivo* against *T. lewisi* which had just appeared in the blood but had not yet undergone a number crisis, the trypanocidal power was manifested by a decrease in numbers or the complete disappearance of the trypanosomes within 1 to 5 hours after the injection of the serum

"2. The presence of a trypanocidal substance in the serum during the course of infection is probably correlated with the occurrence of the first number crisis which occurs in uninfluenced infections with *T. lewisi* about the sixth to tenth day of infection.

"3. Serum obtained from rats shortly after the end of an uninfluenced infection exhibited a similar trypanocidal action when tested in the same way. Such serum was trypanocidal to trypanosomes tested either before or after the first number crisis. Serum tended to lose its curative power within a few weeks after the termination of infection.

"4. When serum obtained during or soon after the end of infection was given in graded doses to a series of rats, in certain series recurring zones of complete or partial action and of inaction tended to occur; i.e., the serum caused complete disappearance or diminution in number of trypanosomes in certain doses of a series, was ineffective in slightly higher doses, was effective in still higher ones, and so on.

"5. The zonal phenomenon appeared to depend on the number of trypanosomes present in the rats at the time the doses of serum were administered:

"(a) When there were very few trypanosomes (1-20 per field) the serum tended to be effective in all doses.

"(b) When there were slightly more numerous trypanosomes (20-40 per field) the serum tended to show the zonal phenomenon.

"(c) When there were very numerous trypanosomes (approximately 50 per field) the serum tended to be ineffective.

"6. The curative effect was more marked after intravenous injection of the serum, but curative and zonal action followed either intravenous or intraperitoneal injection.

"7. Inactivation did not decrease the curative power of the serum. Moreover, the zonal phenomenon was independent of inactivation.

"8. Serum from rats and rabbits hyperimmunized against *T. lewisi* by repeated injections of the living parasites exhibited similar curative and zonal action"

W. Yorke.

MARMORSTON-GOTTESMAN (J.), PERLA (David) & VORZIMER (Jefferson). **Immunological Studies in Relation to the Suprarenal Gland. VI a. *Trypanosoma lewisi* Infection in Normal Albino Rats. VI b. *Trypanosoma lewisi* Infection in Suprarenalectomized Adult Albino Rats.**—*Jl Experim. Med.* 1930. Oct. 1. Vol. 52. No. 4. pp. 587-600. With 1 text fig. [21 refs.]

PERLA (David) & MARMORSTON-GOTTESMAN (J.). **Further Studies on *T. lewisi* Infection in Albino Rats. I. The Effect of Splenectomy on *T. lewisi* Infection in Albino Rats and the Protective Action of Splenic Autotransplants. II. The Effect of Thymectomy and Bilateral Gonadectomy on *T. lewisi* Infection in Albino Rats.**—*Ibid.* pp. 601-616. With 4 text figs. [18 refs.] [Montefiore Hosp., New York.]

It has been shown, as the authors adduce, that the suprarenal glands play an essential part in the processes of resistance to toxins and bacterial infections and that (in albino rats) removal of these glands lowers this resistance and diminishes the capacity for antibody formation. The object of the present studies is to determine what part the suprarenals and other glands of internal secretion play in resistance to a protozoan infection as exemplified in *Trypanosoma lewisi*.

The course of this infection was studied in 40 normal albino rats as a basis of comparison. The rats were all of one stock and raised in one Institute; except as otherwise specified they were 3 months old. They were kept in a uniform environment and on a standard adequate diet. A given strain of *T. lewisi* was maintained by weekly transference, and a standard amount of infected heart-blood diluted with citrated physiological saline was used in intraperitoneal inoculations. In these circumstances the infection in the normal white rat lasts about a month, its height being at about the 7th day. It produces a definite disease, during the first 10 days of which the spleen gradually enlarges to 6 or 7 times the normal size, with hyperplasia of the follicles, congestion of the pulp, and marked phagocytosis of the red cells by reticular and endothelial elements. With recovery the spleen proceeds to contract. Concomitant Bartonella infection causes a moderate anaemia. The best indications of natural resistance by the rat are afforded by daily counts of trypanosomes, by the length of the show of developing forms, and by the duration of the infection. The serum of the rat during the continuance of infection is highly anticomplementary; after recovery complement-fixing antibodies can be detected for a long term, and the best antigens for detecting them are saline extracts of rat-spleen removed at the height of infection, and saline washings of unkilld cultures of trypanosomes. The immunity to *T. lewisi* subsequently enjoyed by the rat is thus an acquired immunity.

T. lewisi being distinctly pathogenous for normal rats (and to very young rats occasionally fatal), the results of this infection in rats after the suprarenals had been removed are next studied and may be thus summarized: After removal of both suprarenals the resistance to an infection is lowered, but the multiplication of the trypanosomes is not enhanced, nor is the disease protracted, nor yet is the production of immunizing substances intercepted; the defection in natural resistance must therefore be due to the toxic effects of the parasite. The immunity to *T. lewisi* acquired by normal rats as a result of infection is not broken by subsequent

removal of the suprarenals. After removal of one kidney, or after injury to the tissue round the suprarenal areas the infection pursued its usual course as in the normal rat; all the rats (13) survived and acquired immunity to re-infection.

Further experiments on the results of splenectomy, of the removal of the thymus gland and of the testes are thus summarized by the authors themselves:—

"The mortality of splenectomized rats from *Bartonella muris* anemia increases from 30 to 100 per cent. following the injection of *T. lewisi* at the height of the anemia 7 days after splenectomy. *T. lewisi* infection 48 days after splenectomy that is to say at a time when the *Bartonella* anemia is no longer present produces a more severe infection than in normal rats. The number of trypanosomes at the height of infection averages 3 times the ordinary and the infection endures twice as long. Both the immune substance that inhibits the reproduction of the parasite and the lytic factor are markedly depressed. Splenic autotransplantation performed 4 weeks prior to splenectomy raises the resistance of rats to a subsequent *T. lewisi* infection. Thymectomy in 6 week old rats diminishes the severity of a subsequent trypanosome infection and shortens its course. Both the formation of the immune substance which inhibits reproduction of the trypanosomes and formation of trypanolytic antibodies are stimulated by this procedure. In the adult rat thymectomy shortens the course of the infection but the severity is only slightly diminished. Bilateral gonadectomy in the adult increases the severity of the infection. The number of trypanosomes at the height of the infection is almost three times the normal. However, the duration of the infection is the same as in the normal rats. The reproduction-inhibiting factor is depressed by bilateral gonadectomy but not the trypanocidal factor. Unilateral gonadectomy does not influence the infection."

A. A.

SCHWETZ (J.). *Trypanosoma lewisi* et splénectomie. [The Effect of Splenectomy on Receptivity to *T. lewisi*.]—*Ann. Parasit. Humaine et Comparée*. 1931. Jan. 1. Vol. 9. No. 1. pp. 10-14. [6 refs.] [Parasit. Lab., Stanleyville.]

The author criticizes the conclusions of REGENDANZ and KIKUTH and of BRUYNOGHE and VASSILIADIS with regard to the effect of splenectomy in rendering rats and mice receptive of infection with *Trypanosoma lewisi*. In his own experiments with rats of Stanleyville, a large proportion of the adults of which—but never the young—are found naturally infected with *T. lewisi* of typical form but rarely (only one individual so far) with dividing forms and rosettes, he finds no conclusive evidence that splenectomy has any such effect. He desplenated 20 rats, of which 6 were infected with *T. lewisi* and 14 were not infected. The operation had no effect upon the infection of the 6, except that in 3 of them dividing forms appeared. Of the 14 uninfected, 12 still remained free of infection until their death or disappearance (17 to 95 days after the operation); but 2 did show trypanosomes, one of them 7 days, the other 34 days after the operation, though the author is not convinced that the appearance of the parasites was attributable to the operation, since both these rats were infected with fleas.

A. A.

CLEVELAND (L. R.) & COLLIER (Jane). The Cultivation and Differentiation of Haemoflagellates in Autoclaved Media.—*Amer. Jl. Hyg.* 1930. Nov. Vol. 12. No. 3. pp. 614-623. [4 refs.] [Med. School, Harvard Univ., Boston.]

This paper consists of descriptive detail of nineteen kinds of autoclaved media used by the authors, and of statistical tables of comparative flagellate

growth in certain autoclaved and not-autoclaved media. It cannot be abridged.

A. A.

CLARK (Herbert C.) & DUNN (Lawrence H.). **Experimental Efforts to transfer Monkey Malaria to Man.**—*Amer. Jl. Trop. Med.* 1931. Jan. Vol. 11. No. 1. pp. 1-7. [2 refs.] [Gorgas Memorial Lab., Panama.]

The authors, after stating that the New World monkey-malaria "is difficult if not impossible to distinguish from human quartan and tertian malaria," describe their careful attempts to transmit the malaria parasites of some wild Spider-monkeys (*Ateles*) to some men. They used three wild red spider-monkeys, *Ateles geoffroyi*, from the Panama jungle, all with naturally acquired malaria infection in "a moderate degree." To begin with, five young men (18 to 21 years) received, part *intravenum* part *subcutim*, 1.5 cc. of undiluted whole monkey heart-blood. "None of the five men developed any noteworthy evidence of illness, although a few doubtful intracorpuseular bodies were found in an occasional blood-film" by the four experts who did the routine search of films. A control monkey inoculated from the same source as the men showed malaria infection on the 11th day, became very ill with the disease, and died of it on the 48th day." Work was then started on the local Anopheles, two species of which, namely *A. albimanus* and *A. tarsimaculatus*, were proved to be efficient hosts of the monkey parasite. The four available species of Anopheles were bred and were fed on the malaria monkeys, some of them on a very heavily infected "infant" *Ateles*. Three of the young men were in due time freely subjected to the infected Anopheles; they were observed for some weeks afterwards, but nothing of consequence was noticed except in the case of one man who had several rises of temperature to about 100° F. and whose films on two occasions showed "one or two forms" that were considered to be malaria parasites. This experiment was subsequently repeated when all five men were subjected to the attentions of Anopheles fed on monkeys carrying gametes. "Nothing resulted from these efforts to transfer the parasite." One experiment was made with a heavily parasitized black spider-monkey, 2 cc. of whose blood was injected subcutim into each of two of the men. Nothing of note resulted, although a control white-face monkey showed infection on the 11th and became seriously ill. CRAIG subsequently gave a historical review of attempts to transmit monkey malaria to man and *vice versa*.

A. A.

CANNON (Paul R.) & TALIAFERRO (William H.). **Acquired Immunity in Avian Malaria. III. Cellular Reactions in Infection and Superinfection.**—*Jl. Preventive Med.* 1931. Jan. Vol. 5. No. 1. pp. 37-64. With 1 coloured plate. [20 refs.] [Depts. of Path., Hyg. & Bact., Univ., Chicago.]

This is a finished study, mainly corroborative in result, but precise and full of exact and critical detail, of the processes of defence in birds (canaries) experimentally inoculated with avian malaria (*Plasmodium cathemerium*). Since it is known that the defence is phagocytic, attention was fixed particularly on the tissues richest in phagocytic cells—

that is, on the reticulo-endothelial system. In the study of pathological changes incident to a *primary* infection a minute description of the nature and succession of the cell-reactions registered in the tissues of the spleen and liver is given; it is a record, up to the stage of crisis, of heightened activity of the mesenchyme and destruction of the parasites by macrophages chiefly of the spleen and liver; the outstanding feature immediately following the crisis is accumulation of pigment in these macrophages, and subsequently its comparatively rapid disappearance as contrasted with human malaria. In birds having a *latent* infection "the altered reactivity of the mesenchyme following the crisis persists," so that in attempts at superinfection phagocytosis is well started within 15 minutes and the injected parasites cannot be found in the peripheral blood 24 to 48 hours afterwards; this activity declines very slowly as tested by attempts at superinfection, being still effective 654 days after the initial infection. Thus acquired immunity to superinfection is primarily cellular and consists in an increased rate of phagocytosis by the cells of the reticulo-endothelial system, especially of the spleen and liver.

The paper is prefaced by a historical retrospect, concludes with a list of references, from DANILEWSKY 1890, and is illustrated by a good coloured plate.

A. A.

i. MARCHOUX (E.) & CHORINE (V.). Conditions qui régissent le processus de la fécondation pour *Haemoproteus paddae*. Température. [**Conditions that govern Fecundation of *Haemoproteus paddae*. Temperature.**]—*C.R. Soc. Biol.* 1931. Feb. 6. Vol. 106. No. 4. pp. 261–263.

ii ——— & ———. Influence de la concentration sur le processus de fécondation des gamètes d'*Haemoproteus paddae* à la température de 21°. [**Influence of Density of the Medium on Fecundation of Gametes of *Haemoproteus paddae* at 21° C.**]—*Ibid.* pp. 263–264.

i. Observations, *in vitro*, under a suitable technique, of the process of fertilization of the macrogametes of *Haemoproteus paddae* show that oocinets are formed readily (at 4 to 6 minutes) at temperatures from 20° to 30° C. At about 36° C. fertilization occurs very quickly (at 1½ minutes) but about this temperature the further development of the macrogamete ceases and it degenerates in 24 to 48 hours. On the other hand, cooling of the blood below 20° delays fecundation—to 17 to 20 minutes, at 13° C.

ii. Further observations under varying conditions of concentration, brought about by withdrawal of fluid or by additions equal to 0.25 to 1.0 per cent. salt solution, showed that neither rapidity nor achievement of fecundation was sensibly affected by such changes in the density of the medium.

A. A.

MANALANG (C.). **Coccidiosis in Anopheles Mosquitoes.**—*Philippine Jl. Sci.* 1930. June. Vol. 42. No. 2. pp. 279–281. With 4 figs. on 2 plates.

In "about 1 or 2 per cent." of *Anopheles* imagoes of all the common species occurring in certain places in Luzon the author found, in all parts of the body except the midgut, the brain, and the ovary, oocysts of a coccidoid. In* only one instance was the infection found in a larva. In one place the infection was extremely frequent and sometimes so intense

as to be fatal. The author kept some of the oocysts for 3 months in a moist atmosphere at room temperature without observing any notable change in them, and he here describes and figures them as "Coccidium."

A. A.

SCHUMAKER (Eugene). *Balantidium coli*: **Host Specificity and Relation to the Diet of an Experimental Host.**—*Amer. Jl. Hyg.* 1930. Sept. Vol. 12 No. 2. pp. 341-365. [17 refs.] [Johns Hopkins School of Hyg. & Public Health, Baltimore.]

The results of experimental cross-infection with *Balantidium coli* from the pig (and from man) into other species of animals are historically reviewed. The author's own experiments, undertaken with the object of providing a handy and susceptible laboratory animal for use in studying the influence of diet upon the parasite—e.g., the inhibitive effect of milk diet, suggested by GREENE & SCULLY (see this *Bulletin*, Vol. 21, p. 42), and the provocative influence of a carbohydrate diet indicated by AGUILAR (see this *Bulletin*, Vol. 24, p. 30)—are fully described and tabulated.

Using trophozoites of *Balantidium coli* from the caecum of the pig, 9 guineapigs, all ascertained to be free from the parasite, were inoculated within the stomach; six became infected, the maximum duration of the infection being 18 days; but this animal is deemed to be inconvenient for experimentation. Of 305 rats fed on a diversity of diets infection was established in 173, the maximum duration of infection being 159 days, division and conjugation being observed, but not encystment. Of 6 rats having a well-established and heavy infection and kept on a whole-milk diet the infection was entirely thrown off in one, greatly reduced in 7 days in three, and apparently unaffected in one—the remaining rat dying earlier, while still infected. Again, of 19 rats inoculated after being kept on a whole-milk diet, only 2 took the infection. A diet of 70 per cent. casein prevented infection in all of 18 experiments; and eliminated heavy infection in all of 12 experiments. Varied experiments proved that an existing infection was aggravated by an increasingly carbohydrate diet, and that a diet containing 93.5 per cent. carbohydrate and no casein was the most favourable, of all those used, for the development of *Balantidium*. Furthermore, it was observed that the presence of starch—either jellied or granular—in the caecum of the rat caused a great multiplication of the *Balantidia* within a few hours.

Since rats harbour "balantidia in numbers as great as 500,000 per cc. of caecal content" without any ill symptoms, it is concluded that the parasite is not pathogenous to the rat—under the observed conditions.

A. A.

SCHUMAKER (Eugene). **The Cultivation of *Balantidium coli*.**—*Amer. Jl. Hyg.* 1931. Jan. Vol. 13. No. 1. pp. 281-295. [16 refs.] [Johns Hopkins School of Hyg. & Public Health, Baltimore.]

The author briefly reviews some of the observations that have been recorded on *Balantidium*, since 1913, when PROWAZEK kept it alive for 7 days by mixing physiological saline with the faeces, and 1921, when BARRET and YARBROUGH described a method for its cultivation. With regard to the statement, originated by the latter authors, that it is anaerobic he states his own experience that it multiplies as freely under strictly anaerobic conditions as under aerobic conditions; but not better. The growth of *Balantidium* is not inhibited by an oxygen pressure of 18 lb. per sq. inch maintained for 32 hours. (The trophozoites from a rat were not killed by an oxygen pressure of at least 30 lb. per sq. inch maintained for 72 hours.)

In his cultivation experiments he followed quite successfully the technique of REES (*Science*, 1927, Vol. 66, pp. 89-91) and JAMESON (this *Bulletin*, Vol. 25, p. 263) but using only 10 cc. of medium per tube. This medium consisted of 1.0 cc. of sterile horse-serum and 9.0 cc. of sterile Ringer's solution of the formula NaCl, 6.5 gm.; KCl, 0.14 gm.; CaCl₂, 0.12 gm.; NaHCO₃, 0.2 gm.; NaH₂PO₄, 0.01 gm.; distilled water, 1,000 cc. With regard to the use of rice starch as a nutrient in cultures initiated by DOBELL and LAIDLAW (1926, this *Bulletin*, Vol. 24, p. 363), he finds that potato, wheat, corn, buck-wheat, and arrowroot starches served as well, and that inulin may serve to a slight extent. *Balantidium* multiplied at temperatures from 23° C. to 41° C.; the optimum seemed to be 37° C. to 39° C. Multiplication was not markedly inhibited at 41° C., but was greatly reduced at and below 34° C.

A. A.

SCHOURENKOVA (A.) & NOSSINA (V.). La culture du *Balantidium coli* Malm. d'origine humaine. [Culture of *Balantidium coli* Malm. from Man.]—*Bull. Soc. Path. Exot.* 1930. Oct. 8. Vol. 23. No. 8. pp. 780-786. [4 refs.] [Trop. Inst., Moscow.]

A description in extensive detail of the management, behaviour, and development of *Balantidium coli* cultivated from human sources.

The medium consists of "a mixture of nutrient agar (or that used for N N N medium) 3 cm.₃ and animal charcoal 0.05 cm.₃; Locke's solution 8 cm.₃ and normal horse-serum 1 cm.₃; and 1 or 2 loopfuls of rice-starch." The medium is charged, preferably, with quite fresh human faeces (0.5 cm.₃); incubated at 37° C. a brisk production of gas occurs, and in the turbid fluid that first collects at the very bottom of the culture-tube active balantidia are found in enormous numbers. Subcultures (into a similar medium already warmed) are made every 24 hours, but after the third subculture the interval may be increased to as much as 5 or 6 days. The number of balantidia—as also the amount of gas formed—decreases in successive subcultures. In the later subcultures the balantidia are also found feeding on the rice-starch. In subcultures of 2-4 days' growth a large number of very small (30-40 μ) forms are to be seen, some of them with a relatively large, widely open, and vertical peristome, and among these "an epidemic of conjugation" occurs. In the medium described encystment does not take place, but encystment of individuals—not of conjugants—may be observed if bouillon is substituted for Locke's solution.

A. A.

NORONHA (A. J.). On the Occurrence of Protozoan Bodies in the Blood of Two Patients suffering from an Eruptive Fever.—*Jl. Trop. Med. & Hyg.* 1931. Jan. 15. Vol. 34. No. 2. pp. 17-19. With 3 text figs. [Path. Lab., B. J. Med. School, Poona.]

In blood films of two of six cases of an eruptive fever in members of two American missionary families in Poona were found a few intra- and extra-corpuseular bodies some of which resembled Babesia in shape. It seems very doubtful if these are actual parasites. They may be artefacts or merely organisms deposited on the slide from the water used in staining. This view is supported by the facts that they occurred in films from only two of the cases, were very scarce, and possessed nuclei which took a bright violet colour with Leishman's stain. Similar bodies have been described previously, but in no case has their parasitic nature been established.

C. M. Wenyon.

MORISHITA (Kaoru). **A Flagellate Protozoon found in a Human Blood Smear.**—*Taiwan Igakkai Zasshi* (Jl. Med. Assoc. Formosa). 1930. Sept. No. 306. [In Japanese. With 24 figs. on 1 plate. English summary pp. 58–59.] [Govt. Research Inst., Formosa.]

According to the English summary the flagellate was a Crithidia, with a small admixture of Leishmania and transitional forms, found in a blood-smear. "Suspicion must be thrown on their source." "Most likely . . . the ever-present *Lucilia* had selected the spout of the distilled-water flask for having a drink."

A. A.

NYASALAND PROTECTORATE. **The Medical Entomologist's Report for 1929** [LAMBORN (A. W.)].—*Nyasaland Protectorate Ann. Med. Rep. on Health & San. Condition for Year ending 31st December, 1929.* Appendix I. pp. 38–41.

Much interesting information is contained in this clear and concise report. In a tsetse-fly reconnaissance in the upper Likuni valley in July (the cool season) *Glossina morsitans* was found in open grass country almost equally as in woodland. This confirms an observation made in June by Game Warden WOOD, and an earlier observation reported by the author in 1928. Clearings were made in certain parts of the Likuni valley where it is hoped that considerable settlement will follow, since the soil is suitable for tobacco, and other inducements have been offered to native settlers—a rebate of hut-tax, and a rifle to each village, portending meat.

In connexion with malaria problems an attempt was made to find out how mosquitoes—particularly *Anopheles*—so numerous in the hilly country during the wet season, survive the dry season of their discontent. It was found that in the dry season the eggs of *Aedes aestivate* there (as elsewhere) in the dry debris of rot-holes, and the eggs of other local culicids in the humus of hollows in the ground and in the rocks. These and certain other suggestive observations tend to justify the surmise that the eggs of the local *Anopheles* have a similar aestivation.

Experiments on a large scale were continued on the possibility of a cyclic transmission of trypanosomes by arthropods other than *Glossina*; experiments with *Ornithodoros* and *Cimex* were unsuccessful. In the course of securing a constancy of fresh-emerged "clean" *Tabani* for a continuation of these experiments the seasonal bionomy of the local species of *Tabanus* was made clear, from an absence of the flies in the late rains and a great scarcity in the earlier part of the dry season, to a vexatious and aggressive abundance between the beginning of October and the end of December. An interesting discovery was made also that preparatory for pupation the larva of *Tabanus biguttatus* fashions out of the still plastic mud of its dried pool a cylindrical mud pillar which it then excavates so as to convert it into a cylindrical pupa-chamber. Exit from this chamber preparatory for the issue of the imago must (it is surmised) be effected by the spines at the top of the pupa-case. The function of the definitely compacted pupa-chamber is, no doubt, to protect the pupa from exposure when the hardening mud of its environment cracks and yawns. In one dried bottom the author collected 109 of these cylindrical pupating chambers. The fact that this common species has this habit and thus has definite breeding-

places where the individual puparia can be recognized is of obvious importance in the question of its control.*

A. A.

CEYLON. Report of the Medical Entomologist for the Year 1929

[CARTER (Henry F.).—*Ceylon Administration Rep. Director Med. & San. Services, 1929.* Appendix pp. C61–C65.

This is a copious and concise report of a wide and purposeful routine animated by the spirit of research. In the quest for naturally infected malaria-carriers, 1,468 anophelines, representing 7 species, caught during the year in houses and cooly-lines in different parts of the country were dissected, and 38 of them, all of the species *Anopheles culicifacies*, were found to be infested with oocysts or sporozoites, or with both; infested specimens were caught in every month except June, July, August and October. In the course of surveys of breeding-grounds in various places larvae of the dangerous species *listoni* and *culicifacies* have been observed in streams and rivers (when not in flood) and occasionally even in parts of streams where the water is of varying degrees of salinity, in irrigation channels, in rice-fields, in trenches (except those fresh cut and those containing much vegetable debris) in coconut plantations, and occasionally in ponds and pools; they appear to be little fastidious. Routine survey work includes "investigatory" surveys of the results of mosquito-malaria control work, the investigations being made by an experienced field assistant whose standardized observations are methodically checked and recorded and charted. In control operations the substitution of properly prepared slaked-lime for coir-dust as a vehicle for distributing Paris green promises to be an improvement. In addition to a wealth of detail relating to mosquito-malaria surveys, the Report also includes references to progress of the departmental museum, to courses of lectures and demonstrations to medical, sanitary, and other officers, and to an ever-swelling flood of material to be examined and identified in confederation with the department of Anti-malaria Campaigns. Among miscellanea are mentioned a minute black midge, *Lasiohelea stimulans*, usually mistaken for the "eye-fly," which appears at certain times and bites persistently; and to the small Staphylinid beetles, *Paederus alternans*, whose irritant secretion causes dermatitis. Experiments show that the inflammatory reaction may be delayed as much as 3 days.

A. A.

IMPERIAL INSTITUTE OF ENTOMOLOGY. Report of the Third Imperial Entomological Conference 17-27th June, 1930.—59 pp. 1930.
London: 41, Queen's Gate, S.W.7. [2s.]

The Third Entomological Conference, which sat in London from the 17th to the 27th June, 1930, included 33 delegates representative of the Overseas Empire in Africa, Australia, Canada, Ceylon, Cyprus, Federated Malay States, Fiji, India, New Zealand, Straits Settlements, Trinidad, and West Indies. Of the nine subjects set for discussion two—Tsetse Control and Biological Control of Insects—come within the purview of medical entomology. On the subject of tsetse control

* See also *Proc. Roy. Soc., Ser. B.*, Vol. 106, p. 83.

SWYNNERTON gave an account of his work in Tanganyika Territory—(1) research and (2) experimental reclamation by large scale clearing, late firing of grass, followed by settlement, organized through native tribal co-operation. It had been "fairly proved" by observation that in Tanganyika fly "centres" or "concentrations" were the feeding-grounds of the flies, "to which they resorted when hungry—all the year round." Experiments in poisoning vegetation, in dense planting of trees, and other treatment of the breeding-grounds of the flies were mentioned, as also the question of diverting or game-fencing lines of traffic through fly-belts. A continuous line of dense thicket has been found to act as an alternative or an adjuvant to a game barrier. In discussion, LLOYD'S communication from Nigeria stated that in that country removal of heavy bush from the foci of *Glossina palpalis* and *tachinoides* was effective, and that field work has concentrated on clearings round threatened towns and important fords, and removal of the population from infested tracts that are too deeply eroded by ravines to permit clearing. CHORLEY said that in S. Rhodesia the population is much too scanty to justify a present policy of clearing, and the savannah grass too short to supply annual fires; broad game barriers, within which the game is shot, is the present practice. LAMBORN said that in Nyasaland of perennial streams there is no seasonal concentration of game and therefore no concentration of fly for attack; moreover, the population is too scarce and the tribal authority too weak for organized clearing. Hale CARPENTER for Uganda advocated concentration of the native population in bigger settlements. Organized grass-burning against *G. morsitans* was there not practicable, since there are two wet seasons. In the summary, the special difficulties in S. Rhodesia and Nyasaland were recognized, and admiration for SWYNNERTON'S methods, based on native tribal co-operation, was expressed.

On the subject of Biological Control of Insects by predatory creatures two voices raised a plea in favour of *Megarhinus* larvae *versus* mosquitoes that breed in holes in trees, and were answered from Hawaii and India in tones of disparagement. SWYNNERTON indicated the difficulties of the attempt to control *Glossina* by biological means. [No one seems to have clearly argued, in well-defined terms, the difference between reasoned biological control under the tame conditions established by man, and blind attempts at biological control in the unrestricted welter of the natural environment.]

A. A.

MARTINI (E.). Klima und Seuchen vom Standpunkte des Entomologen. [*Climate and Infection from the Entomological Standpoint.*]—*IV. Internat. Congress of Entom., Ithaca, Aug. 1928.* Vol. 2. 1929. pp. 463-477. With 2 text figs. [Inst. for Ship & Trop. Diseases, Hamburg.]

This is a discourse before an international congregation of entomologists assembled at Ithaca in 1928. The teacher observes the legions of the Insects disputing the sovereignty of man, and concentrates on those that assail the paragon of animals himself by spreading his specific infections. But insects are not almighty. Climate sets bounds to their range and activity; and it is on climate that the lecturer dilates—since the insect excitants and transmitters of infections "belong for the most part to a flora and fauna that depend on climate" (gehören grossteils zur klimatisch bedingten Flora und Fauna). This gives the

discourse an academic rather than a practical bent. Moreover, as Darwin long ago argued, in the struggle for existence climate acts in main part indirectly, often by favouring or by obstructing some species quite remote in the zoological scale from the species ultimately affected ; and it is not this complex indirect effect of climate—which too often the impatient “practical” man is inclined to ignore—that is here considered, but rather the direct effects of warmth, the adverse influence of a dry atmosphere and the propitious influence of a moist atmosphere on insect life, and the vitally protective value of chitin. The address, in short, as its title indicates, is a review from an entomological standpoint, and one of its main conclusions, suggesting that the light thrown by medical entomology on the originative processes of infective disease has almost eclipsed that formerly furnished by pure bacteriology, must have gratified the assembled entomologists—albeit that “comparisons are odorous.”

A. A.

KEMPER (Heinrich). Beobachtungen ueber die Wirkung von Insektenstichen. [**Observations on the Effects of Insect-Bite.**]—*Arch. f. Dermat. u. Syph.* 1930. June 14. Vol. 161. No. 1. pp. 127–145. With 6 text figs. [38 refs.]

This is a summary review of recent publications on what one must call insect-bite, since it refers to wounds inflicted by the mouth-parts and does not include stinging insects. It is dermatology as influenced by serology rather than as advanced by entomology or zoology. The biting insects included are the bedbug, *Aedes aegypti*, the waterboatman (Notonecta), the stable-fly (Stomoxys), the flea, and Ceratopogon. It concludes with a few “general remarks on the problem of *Stichwirkung*.”

A. A.

SCHWETZ (J.). Sur quelques diptères hématophages du Congo. [**Some Bloodsucking Flies of Congo.**]—*Bull. Soc. Path. Exot.* 1930. Nov. 12. Vol. 23. No. 9. pp. 987–994. [3 refs.]

In Belgian Congo “all the little beasts that prick” are called “maringoins,” and the author here mentions some of them and says something about them. *Phlebotomus africanus*, *P. collarti*, *P. simillimus*, *P. schoutedeni*, and *P. schwetzi* (minute and diaphanous, the only one of them that also feeds on cold-blooded animals); *Culicoides grahami* (very minute, the most widely distributed species, sometimes occurring in swarms along with *Simulium damnosum*), *C. inornatipennis*, and *C. milnei* (which so far has been found only in native huts, and is said to bite at night); *Simulium damnosum* (common, occasionally trespassing into houses alongside rivers). The author states that *Filaria perstans* and onchocercosis occur in Belgian Congo and that leishmaniasis is unknown there.

A. A.

TAYLOR (A. W.). **The Domestic Mosquitos of Gadau, Northern Nigeria, and their Relation to Malaria and Filariasis.**—*Ann. Trop. Med. & Parasit.* 1930. Oct. 22. Vol. 24. No. 3. pp. 425–435. With 1 chart in text. [5 refs.]

An interesting report. The climate of Gadau is dry ; the average annual rainfall is 28 inches, all between April and October. Mosquitoes

generally are numerous only from July to November. [In November and December and in April and May of the respite no figures are recorded, the author having been away from the Station during the first two of these months.] During the term June 1929 to March 1930 (with those interruptions) only 74 culicines were taken in daily catches from *European* bungalows, against 2,134 anophelines. Of the anophelines 47.2 per cent. were *A. costalis* (84.7 per cent. of them caught in August and September) and 44.2 per cent. were *A. funestus* (95.4 per cent. of them caught in August, September, and October); the remaining 8.6 per cent. were composed of *A. squamosus* (3.7), *A. pharoensis* (2.2), *A. mauritanus* (1.7), *A. rufipes* (0.6), and *A. nili* (0.4). Of the 74 culicines nearly half were *C. nebulosus*.

Dissections of 3,563 anophelines and 117 culicines were made. *A. costalis* and *A. funestus* are the only species that were proved to carry malaria parasites. The first infection of *costalis* appeared in June; of *funestus* in July—in both cases both sporozoites and zygotes. Considerable fluctuations of the sporozoite-rate were observed in both species during the rains. Both *A. costalis* and *A. funestus* are also heavily infected with *Filaria bancrofti*, both in the European and the African quarters of the Station. A mature filaria infection was seen in an individual *Aedes ochraceus*, and some infections of the thoracic muscles in *A. pharoensis* and *A. squamosus*.

Some other parasites of mosquitoes are casually noticed—nematodes in gut and body cavity in several species of Anopheles; nematode ova (?) in ovaries of *A. costalis*; sporiferous cysts in wall of mid-gut of *A. costalis* and *A. funestus*; a heavy infection of small oocysts (*Plasmodium praecox* (?) zygotes) in *Lutzia tigripes*, and also in this species, a *Herpetomonas* infection; and a heavy *Spirochaete* infection of the midgut in a *Culex nebulosus*. A. A.

HANCOCK (G. L. R.). **Some Records of Uganda Mosquitoes and the Oecological Associations of their Larvae.**—Reprinted from *Bull. Soc. Roy. Entom. d'Egypte*. 1930. New Ser. No. 1. pp. 38–56. With 9 figs. on 5 plates. [25 refs.]

These notes, it is stated, are recorded not so much for the diffusion of knowledge as for affording some necessary guidance to the entomologist recently appointed to the local Medical Department. "They are unavoidably fragmentary, and are intended . . . to serve as a basis for future work." Although not entirely novel, they are extremely interesting and to the point, and will admirably fulfil their purpose. Attention has of course been given to breeding-waters of anophelines, which are summarily classified. The local observations support those made elsewhere that waters visibly charged with iron-hydroxide are unsuitable for anopheline larvae, and that (in the absence of this particular impurity) the special breeding-waters for all anophelines, except *implexus*, were swamps, selvedge of lakes and sluggish streams, ditches, pits, water-holes, and wells. The elements of the microflora have been carefully noted, also the predaceous fishes, water-bugs and water-beetles and dragon-fly larvae, although, in the absence of specialists, not yet specifically identified. Among house-haunters *gambiae* (*costalis*) is noticed as the commonest Anopheles, followed by *funestus*, both being notorious malaria carriers. A list of the local Culicidae is appended, the Culicinae identified by EDWARDS. A. A.

SCHWETZ (J.). Les moustiques de Stanleyville (Congo Belge). [**Mosquitoes of Stanleyville.**].—*Ann. Soc. Belge de Méd. Trop.* 1930. Mar. 31. Vol. 10. No. 1. pp. 25–65. With 9 figs. on 6 plates & 1 map. [1 ref.] [Parasit. Lab., Stanleyville.]

Stanleyville stands on the northern bank of the Upper Congo, almost on the equator, in the very middle of Africa. This well-illustrated paper contains lists of the mosquito-species bred and caught in Stanleyville and its suburbs in the course of a year, but is chiefly taken up with their different types of breeding-places and their specific aquatic vegetation, and their distribution in houses and huts in different parts of the town. It is notable that of the species commonly captured in dwellings, several do not breed in the vicinity of dwellings; thus *Culex rima*, one of those most frequently caught in European houses, was only once bred from the collections of larvae. On the other hand, several of the species most frequently bred from larvae were never caught either in houses or in huts—this was notoriously the case with *Aedes vittatus*. A curious fact is that *Aedes argenteus*, very common in collections of larvae and frequently caught in European houses, was not once found in a native hut. As a rule more mosquitoes, and in greater variety, are caught in native huts than in European houses, and while the European house-haunters are chiefly culicines, anophelines (and sometimes *Mansonioides* with them) predominate in native huts; sometimes, indeed, of dozens of the insects caught in a native hut all may be *Anopheles*. These are facts of general interest.

A. A.

HAMLYN-HARRIS (R.). **The Consideration of Certain Factors as Potentialities in Mosquito Control in Australia.**—Reprinted from *Proc. Roy. Soc. Queensland.* 1930. Nov. 13. Vol. 42. No. 10. pp. 86–105. With 8 text figs. & 4 figs. on 2 plates. [25 refs.] [Entomol. Section, Health Dept., Brisbane.]

The following conclusions from the author's observations in the field and laboratory (which are given in detail) are to be noted:

Mosquito breeding-places are definitely selected, and if the insects' attraction to "such places as have a distinct hay infusion" quality be significant the attraction may be determined in part by food-supply. Toxic decomposition-products in the water greatly influence the growth and survival of larvae; albuminoid ammonia, however, insures a bountiful food supply for those of *Culex fatigans*. Larvae can live for a long time without oxygen from the atmosphere. Characeae have no lethal effect on larvae, in the field. "The waters of the [local] rice-fields though conducive to breeding are not selected at the commencement of the season"; the drainage ditches of the Murrumbidgee Irrigation Area are particularly productive of *Anopheles annulipes*. Hp requires careful consideration; it varies with diurnal variations of temperature.

A. A.

HAMLYN-HARRIS (R.). **Halticinae (Col.) as Possible Factors in Natural Control of Mosquitoes in Queensland.**—*Bull. Entom. Res.* 1930. July. Vol. 21. Pt. 2. p. 159. [Health Dept., City Council, Brisbane.]

In a polluted canal near Brisbane that had become clogged with water-weed during a dry spell and crowded with larvae of *Culex fatigans*, it was

noticed that wherever *Jussiaea repens* was flourishing large patches of this plant were killed and blackened by swarms of a small flea-beetle, *Haltica ignea* Blackb.; the water, too, around these patches was discoloured, and all the *Culex* larvae in them were dead, though those outside them were quite active. Opportunities of further observation were swept away by sudden floods. The author, however, offers the observation to the profession, mentioning in addition that apart from it he had noticed the excreta of *Haltica ignea* to be poisonous.

A. A.

MACGREGOR (Malcolm E.). **The Nutrition of Adult Mosquitoes: Preliminary Contribution.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1931. Jan. 31. Vol. 24. No. 4. pp. 465–472. [6 refs.] [Wellcome Entom. Field Lab., Wisley, Surrey.]

The author first draws attention to the two methods of imbibing food practised by mosquitoes, namely steady suction, as when the piercing mouth-parts are thrust through the skin in sucking blood; and “discontinuous suction,” as when the tip of the proboscis is used in collecting fluids other than blood. When blood is fairly sucked (“aspirated”) it passes direct to the stomach, the reaction of which is acid; when fluids other than blood are, as it were, sipped (for in this act of feeding the insects “repeatedly withdraw the tip of the proboscis from the fluid and reinsert it at other sites”) they pass gradually to the oesophageal diverticula, the reaction of which is alkaline. (He also refers to his method of artificial feeding of mosquitoes, and mentions, incidentally, that by this method males have been found to imbibe blood as readily as females and to digest it as promptly.)

The application of his studies of the different mechanisms of feeding has led the author to the following interesting physiological observations.

Pure *virgins* of *Aedes aegypti* a few days old will bite, as is well known, and will fill to repletion either on blood or on a variety of juices. If they bite and suck blood the blood passes to the stomach direct, stimulation of the ovaries follows, and usually eggs are laid; the eggs are normal in appearance, “but have always been found to be infertile.” [It is not pedantic to remark, seeing that a good deal has been written about unduly prolonged delay in the hatching of certain of the eggs of this species, that the author seems not to have experimented with some of the incubatory stimulants of those nonconforming eggs (see this *Bulletin*, Vol. 27, p. 310).] If, however, the virgin insects “take food of any kind primarily into the diverticula,” by discontinuous suction, “ovulation never occurs.” Furthermore: If *fertilized* females of *Ae. aegypti* bite fairly, the whole of the ingested blood passes direct to the stomach, and the production of fertile eggs follows 3 or 4 days afterwards. But if fertilized females are fed artificially on blood containing a trace of honey or other sugary matter, the mixture passes to the diverticula and is rapidly digested without any concurrent effect on the ovaries. Sometimes, however, especially in the case of individuals that have previously laid eggs, activity and development of the fat-body follows. [These observations should be compared with those of CHODOUKINE on *Anopheles* in Turkestan; this *Bulletin*, Vol. 27, pp. 906–907.]

The author has not reported any corresponding experiments with *Culex pipiens*. In his experience it is very difficult to get this species

to bite in England, but all his experiments with it "seem to indicate conclusively that blood is an essential constituent of the food supply for the inception of ovulation." On the contrary, ROUBAUD in France has described [see this *Bulletin*, Vol. 26, p. 808] a race of *C. pipiens* whose females, without getting any food at all in the adult state, produce a succession of generations through the winter [DE BOISSEZON, see this *Bulletin*, Vol. 27, pp. 296, 297, has described a similar phenomenon in France for this species, and HUFF also, *ibid.*, pp. 310, 311, in America]. In the author's experience, females of *C. pipiens* showing the maximum development of the fat-body can be fed artificially either on blood, or on a mixture of blood and honey, or can be induced to take other mixtures by "discontinuous suction"; but all that follows is digestion of the food without either activation of the ovaries or hypertrophy of the fat-body. Nothing else happens if the insects are incubated at 30° C. for 2 or 3 weeks, to insure the reduction of the fat body, before the feed, or even after several meals have been taken and digested. [Here also Cp. this *Bulletin*, Vol. 27, pp. 906, 907].

As this is a preliminary contribution the matter may be left for further investigation.

A. A.

HOWLAND (L. J.). **The Nutrition of Mosquito Larvae with Special Reference to their Algal Food.**—*Bull. Entom. Res.* 1930. Dec. Vol. 21. Pt. 4. pp. 431–439. With 3 text figs. & 4 figs. on 1 plate. [11 refs.] [School of Hyg. & Trop. Med., London.]

With an idea of discovering the value of algae as food (or as convivae of some kind) for mosquito larvae the author carried on much experimental investigation—on the changes undergone by various types of algae in the larval gut, and on larval digestion of algae *in vitro*; on the penetration of various stains into algal cells both before and after digestion, and into digestive cells of larvae; on rearing of larvae in a variety of solutions (from distilled sterilized water to filtered pond water), some without algae and some with algae either living or dead; and on the histology of the larval gut after a diet of algae. As the author states it, "From these methods of approach . . . the whole question of the importance of algal food to the larva is very involved." The author's own summary, which is not very rich in novelties, is as follows:—

"1. Algae are ingested by many species of mosquito larvae and appear to form an important part of the food of these larvae.

"2. The algae are digested in the gut, but the digestion is often by no means complete.

"3. It is quite possible that the rôle played by the algae may also be assumed by other forms of organic matter, for larvae may be reared to maturity in solutions containing little or no algae.

"4. Different algae react differently in the guts of the larvae, some being noticeably digested and some hardly at all.

"5. Those algae which are digested the most are easily stained and are forms of low osmotic pressure.

"6. Cytological investigation revealed no character that indicates that algae are an especially nutritious diet."

A. A.

HINMAN (E. Harold). **A Study of the Food of Mosquito Larvae (Culicidae).**—*Amer. Jl. Hyg.* 1930. July. Vol. 12. No. 1. pp. 238-270. [5 pages of refs.] [Entomol. Dept., Cornell Univ., Ithaca, N.Y.]

From a study of the gut of over 600 mosquito larvae of 17 species—1 *Anopheles*, 8 *Aedes*, and 8 other culicine species—and from incidental sections of *Aedes* and *Culex* larvae, the author concludes that mosquito larvae swallow anything that is small enough to pass through the mouth and that much of what is swallowed cannot be food. He therefore discountenances the theory of preferential feeding. He further observed living and active protozoa and rotifers "well back in the intestine," but attempts to recover pure cultures of bacteria from the intestinal tract "gave inconclusive results." Experiments in rearing larvae in autoclaved water taken from breeding-places, and in adding certain species of bacteria to such autoclaved water are described. But what appear to the reviewer the most wonderful of all the experiments are those in which "eggs of this species [*Aedes aegypti*], sterilized on the exterior, have been introduced into Berkefeld filtered water, and normal adults have emerged in 8 or 9 days (the usual time for transformation under the most favourable conditions)." From these experiments the author suggests the possibility that mosquito larvae and other aquatic animals can normally make use of solutions and suspended colloids—a suggestion originated, as he points out, by PÜTTER, whose papers (in title) are specified in the bibliography. [The suggestion seems sufficiently strange—but distinguished experimental zoologists of this century have suggested theories even more startling, and hardly a philosopher is left to know that he knows nothing.]

A. A.

ROUBAUD (E.). Sur l'existence de races biologiques génétiquement distinctes chez le moustique commun *Culex pipiens*. [**Genetic Biological Races of *Culex pipiens*.**]—*C.R. Acad. Sci.* 1930. Dec. 22. Vol. 191. No. 25. pp. 1386-1388. [1 ref.]

In respect of *Culex pipiens* the author would distinguish two "biological races," the ordinary race (styled by him "heterodynamous") rural in habit and constrained to suck blood and to hibernate; and a cockney race (styled "autogenous") restricted to a city life, which continues breeding throughout winter even when blood is not to be obtained. The author states that he has bred twenty generations of the "autogenous" (or "homodynamous") race in the same cage without supplying any nourishment whatever to the adults. In crossing the "autogenous" or "homodynamous" race with the "heterodynamous" race he found that the "autogenous" peculiarity was absent from the resulting hybrid generation but reappeared in some of the females of the second hybrid generation.

[With regard to the "autogenous" race see the author's paper noticed in this *Bulletin*, Vol. 26, p. 808. With regard to *Culex pipiens* breeding without interruption throughout the winter and without feed of blood see BOISSEZON in Vol. 27, p. 311; and without blood and without any food at all see HUFF in Vol. 27, p. 310.]

A. A.

ROUBAUD (E.) & TOUMANOFF (C.). Intoxications d'encombrement, chez les larves de *Culex* vivant en milieu non renouvelé. [**Intoxication of Overcrowding, of *Culex* Larvae living in a Medium not Renovated.**].—*Bull. Soc. Path. Exot.* 1930. Nov. 12. Vol. 23. No. 9. pp. 978–986. [3 refs.]

The authors' conclusions from a variety of laboratory experiments are that accumulation of excreta of mosquito-larvae overcrowded in a deficiency of water retards or arrests the development of larvae, particularly in their 4th stage. This toxic effect of the excreta is increased at higher temperatures, and when the toxic accumulation is great it may be fatal. At lower temperatures, and as the overcrowding and the supplies of toxic material gradually diminish, surviving larvae though weakened may slowly recover and ultimately complete their evolution. In this delayed larval development due to an unfavourable medium the authors see the analogy of the autumnal "diapause" necessitating a "hibernal reactivation" of many types of insects.

A. A.

HUFF (Clay G.). **Individual Immunity and Susceptibility of *Culex pipiens* to Various Species of Bird Malaria as studied by Means of Double Infectious Feedings.**—*Amer. Jl. Hyg.* 1930. Sept. Vol. 12 No. 2. pp. 424–441. [23 refs.] [Med. School, Harvard Univ., Boston.]

In this study of individual susceptibility to bird malaria in *Culex pipiens* canaries individually infected variously with *Plasmodium calhemerium*, *P. elongatum*, or *P. relictum* were used for feeding the insects. Of a large number of insects fed to repletion on infected birds, 176 were set aside, fed on moist raisins, allowed to oviposit, and subsequently—"within a few days"—allowed to feed again on an infected bird, irrespective of the strain of infection carried by the bird; 132 survivors of the two feedings were dissected 6 or 7 days later. It turned out that it was possible for some individuals to become infected with two species of parasites, for some to escape infection by one species and became infected by another, and for others to escape infection altogether. "Two separate feedings on the same species of parasite brought the result that each individual either became infected both times or failed entirely to become infected (two exceptions out of sixty)."

"The presence of oocysts and their appearances were used as a means of determining whether or not each individual had or had not become infected with each parasite."

A. A.

ST. JOHN (Joe H.), SIMMONS (James Stevens) & REYNOLDS (Francois H. K.). **The Survival of Various Microorganisms within the Gastro-intestinal Tract of *Aedes aegypti*.**—*Amer. Jl. Trop. Med.* 1930. July. Vol. 10. No. 4. pp. 237–241. [2 refs.] [Bureau of Science, Manila, P.I.]

The authors describe their technique and their experiments and mention that J. T. DUNCAN, although successful with a number of other insects and arachnoids, found that bactericidal action was feeble and also limited in range in *Aedes aegypti*. In their own experiments in

vitro tests for germicidal action in the gut-secretions of this insect were negative for *Bact. typhosum* and *Chromobact. prodigiosum*. Their experiments *in vivo* showed that *Chromobact. prodigiosum*, *Myco. leprae*, *Staphylococcus aureus*, and *Cytoryctes variolae* survived in the gut of this insect for at least 24 hours but "could not be demonstrated after an interval of seven or more days." They conclude, therefore, that the microbes in question were not killed by an "active bactericidal principle" but either were slowly digested or excreted. In any case they allow that dangerous transference of the microbes to man would be unlikely except by frequent interrupted feedings of the insect and by contact with broken skin.

A. A.

MCKINLEY (Earl B.) & DOUGLASS (Margaret). **Further Note on the Salivary Gland Poison of *Aedes aegypti*.**—*Proc. Soc. Experim. Biol. & Med.* 1930. May. Vol. 27. No. 8. pp. 845-846. [1 ref.] [School of Trop. Med., Univ. of Porto Rico, San Juan.]

This is a minutely academic study in amplification of the senior author's earlier paper on the subject (this *Bulletin*, Vol. 27, p. 310). The authors now state that "chemical tests indicate the carbohydrate nature of the toxic substance [in the salivary secretion of *Aedes aegypti*] and the skin reactions obtained . . . are quite similar to those obtained with carbohydrates isolated from certain microorganisms."

A. A.

MARTINI (E.) & ACHUNDOW (I.). Versuche über Farbenanpassung bei Culiciden. [**Experimental Observations on Adjustive Colouring of Culicidae.**]—Reprinted from *Zool. Anzeiger*. 1929. Vol. 81. No. 1/4. pp. 25-44. With 7 text figs. [3 refs.] [Inst. for Ship & Trop. Diseases, Hamburg.]

This long paper deals in punctilious detail with the reactive and adjustive modifications of colouring—modifications which may influence also the colouring of pupa and imago—observed in larvae of four species of mosquitoes and of a *Corethra* reared in darkness or in vessels of different colour. It is an isolated study in a limited tract of a biological field that is as extensive as life itself.

A. A.

SINTON (J. A.) & KEHAR (N. D.). **A Field Method for the Estimation of the Salinity of the Water in Mosquito-Breeding Places.**—*Indian Jl. Med. Res.* 1930. July. Vol. 18. No. 1. pp. 199-201. With 1 text fig.

The authors describe the conversion of a graduated 10 cc. delivery pipette into a tube by cutting off the mouth-piece and sealing that end and cutting off also the pointed delivery-end. The pipette (inverted) is now a graduated test-tube. Along with it are carried into the field standard solutions of silver nitrate and a saturated solution of potassium chromate for the estimation of dissolved chlorides. For all the detail which the authors think necessary the original paper must be consulted.

A. A.

- RICHARDSON (Charles H.) & SHEPARD (Harold H.). **The Effect of Hydrogen-ion Concentration on the Toxicity of Nicotine, Pyridine, and Methylpyrrolidine to Mosquito Larvae.**—*Jl. Agric. Res.* 1930. Aug. 15. Vol. 41. No. 4. pp. 337-348. With 3 text figs. [25 refs.]

A fine-spun comparative study of the toxicity for mosquito larvae (*Culex pipiens*) of solutions of nicotine as a base and as a salt, at various pH values and at different concentrations. As a result it appears that in solutions the free base is much more toxic than the sulphate, and that the "nicotine enters the body chiefly through the mouth as molecules or ions in solution rather than as molecules in the gaseous condition." A few experiments with pyridine and with methylpyrrolidine are recorded also, and a few recorded observations on the comparative effects of nicotine as a base and as a salt on animals other than insects are noticed.

A. A.

- EDWARDS (F. W.). **Mosquito Notes. IX.**—*Bull. Entom. Res.* 1930. Oct. Vol. 21. Pt. 3. pp. 287-306. With 8 text figs.

Descriptive and taxonomic entomology. *Anopheles walravensi* from the Belgian Congo, *A. multinctus* and *A. garnhami*, both from Kenya, are described as n. sp. The anophelines Chagasia and Bironella are promoted to generic rank, and the *Bironella travestita* of Brug is separated as a sub-genus *Brugella*.

A. A.

- ROUBAUD (E.) & TOUMANOFF (C.). Essais d'infection expérimentale de larves de Culicides par quelques champignons entomophytes. [**Experimental Infection of Culicid Larvae with Entomophyte Fungi.**]—*Bull. Soc. Path. Exot.* 1930. Dec. 10. Vol. 23. No. 10. pp. 1025-1027. With 1 text fig. [3 refs.]

Larvae of *Culex pipiens* and *Anopheles maculipennis* experimentally infected with spores of the fungi *Beauveria bassiana* and *B. globulifera* took infection which was fatal to some of them.

A. A.

- MIYAMOTO (S.). Ueber Geckonen als Moskitofänger. [**Culicivorous Gecko-Lizards.**]—*Taiwan Igakkai Zasshi (Jl. Med. Assoc. Formosa)*. 1930. Oct. No. 307. [In Japanese. German summary p. 61.] [Med. School, Taihoku.]

Five Japanese house-geckos caged individually from 14 to 30 days were observed to capture individually from 43 up to 59 *Culex fatigans per diem*.

A. A.

- BONNE-WEPSTER (J.). Het geslacht *Taeniorhynchus* (*Arribalzaga*) in Nederlandsch Oost-Indië.—*Geneesk. Tijdschr. v. Nederl.-Indië*. 1930. Sept. 1. Vol. 70. No. 9. pp. 940-965. With 18 figs. (2 coloured, on plates).

- **The Genus *Taeniorhynchus* (*Arribalzaga*) in the Dutch East Indies.**—*Meded. Dienst d. Volksgezondheid in Nederl. Indië*. 1930. Vol. 19. Pt. 2. pp. 196-212. With 18 figs. (2 coloured) on 10 plates. [Med. Lab., Weltevreden.]

The fact discovered by BRUG and DE ROOK, that *Taeniorhynchus* species are transmitters of *Filaria malayi*, increases the actual importance of further knowledge of this genus. The author intends to give a full des-

cription of it, beginning in this article with the subgenus *Mansonioides* Theob.

W. J. Bais.

KALANDADZE (L.). Zur Fauna der Stechmücken in Georgien UdSSR. [**Culicidae of Georgia U.S.S.R.**].—*Arch. f. Schiffs- u. Trop.-Hyg.* 1931. Feb. Vol. 35. No. 2. pp. 110-113. [12 refs.] [Georgian Inst. for Trop. Diseases, Tiflis.]

A bare list, with the local provenance of each species, of 26 mosquitoes actually identified as occurring in Georgia. The species of *Anopheles* are *maculipennis*, *elutus*, *bifurcatus*, *ngripes*, *algeriensis*, *hyrcanus* var. *pseudopictus*, and *superpictus*. The only noteworthy culicine is *Aedes aegypti*.

A. A.

BOYD (Mark F.). **Studies on the Bionomics of North American Anophelines. VI. Some Observations on Imagines.**—*Amer. Jl. Hyg.* 1930. Sept. Vol. 12. No. 2. pp. 449-466. With 1 text fig. [8 refs.] [Station for Field Studies in Malaria, Edenton, North Carolina.]

The purpose of this paper is to record studied observations that bring to light the dangerous malaria-carriers among the anophelines of N. Carolina. The common species there are *Anopheles quadrimaculatus*, *A. punctipennis*, and *A. crucians*. From diverse observations here recorded it is concluded that *A. quadrimaculatus* is an effective and apparently the only local transmitter of malaria; it has avidity for human blood, and after feeding to repletion it continues to shelter in the vicinity of its hosts until the time of oviposal. It does, however, feed freely on cattle, and there is some evidence suggesting that the presence of cattle near dwellings may thus be protective from malaria. All adults encountered in the late autumn and winter were "in a state of hibernation." The other two species do "not appear to be implicated in the local transmission of malaria." *A. punctipennis* has a tendency to linger after feeding, and a small proportion appear to have fed on man; it does not hibernate completely. *A. crucians* matures its ova "in a feral environment."

A. A.

LAUREL (Alberto G.). **Identification of Ingested Blood in the Stomachs of Anopheline Mosquitoes by Means of the Precipitin Test. [Preliminary Study.]**—*Monthly Bull. Philippine Health Serv.* 1930. Apr. Vol. 10. No. 4. pp. 153-166. [11 refs.]

This paper is occupied chiefly with matters of ordinary technique. In the actual tests 7 of 8 specimens of *Anopheles minimus*, 1 of 31 *A. hyrcanus*, 1 of 13 *A. rossii*, and the one available specimen of *A. karwari*, reacted to human blood. Not one of 13 specimens of *A. barbirostris*, of 6 specimens of *A. philippensis*, of 3 *A. fuliginosus*, or of 2 specimens of *A. maculatus*, reacted to human blood. With the exception of *A. minimus* all the other species reacted (45 instances collectively) to cow blood, and there were 2 or 3 reactions to horse blood—besides the "no reactions."

A. A.

ADOWA (A. N.) & SEBENZOW (B. M.). Ergebnisse der 3-jährigen Tätigkeit der hydrobiologischen Abteilung in der Erforschung der Ökologie der Anopheleslarven an den Torfgewinnungsstellen. [*Oecology of Anopheles Larvae in Peat-cutting Districts.*]—*Ztschr. f. angewandte Entom.* 1929. Vol. 15. pp. 170–177. [22 refs.] [Trop. Inst., Moscow.]

For three years the authors and some others have been studying and comparing from the anopheles-malaria standpoint the bogmoss (Sphagnum) marshes and the sedgy (Carex) marshes of the peatmosses near Moscow. The main conclusions of these studies have been noticed from time to time in this *Bulletin* (Vol. 24, p. 883; Vol. 25, pp. 814, 815; Vol. 26, pp. 812, 814) and the authors' summarized experience has been abstracted at some length here (Vol. 27, p. 298). The present paper is the authors' German summary, and restates their final conclusions—emphasizing again the practical importance of the determination of the pH concentration, the oxygen tension, and the electrical conductivity of the water as indications of its fitness or unfitness for *Anopheles* larvae.

A. A.

BRIGHENTI (Dino). Ricerche sulla attrazione esercitata dai colori sugli anofeli. [*Studies on the Colour-Attractions of Anopheles.*]—*Riv. di Malariologia.* 1930. Vol. 9. 10 pp. With 2 text figs. [28 refs.]

An account of 43 observations carried out during June–September in a malarial district with many *A. maculipennis*, near Ferrara. Two byres were divided into stalls each for two animals. These stalls were painted in different colours—blue, grey, red, white, yellow, green and violet. The mosquitoes in each stall were counted. Previous laboratory experiments (NUTTALL, KÔ-RAN and others) had shown that the colours proved attractive in the order yellow, red, white, but under the conditions of the author's investigations results quite different were obtained. The numbers found in each stall are given in the paper, but the results may be briefly summed up by stating that red proved far the most attractive, violet and light yellow coming next in sequence; cobalt blue and dark green attracted least. As regards grey contradictory results were obtained and the numbers varied according to the adjacent colour, the grey nearest red showing many more than the grey next to blue. White was more attractive than grey, but less so than any of the colours. The number on white appeared to depend largely on the illumination, ventilation and aspect.

H. H. S.

BRIGHENTI (Dino). Gli anofelini delle colonie italiane. (*The Anopheline Mosquitoes of the Italian Colonies.*)—*Riv. di Malariologia.* 1930. July–Aug. Vol. 9. No. 4. pp. 429–433. [9 refs.] English summary (2 lines) p. 477.

Of the Mediterranean colonies—Dodecanese (Aegean), Tripolitania and Cyrenaica—*A. pictus* (*A. hyrcanus*), *A. superpictus*, *A. bifurcatus*, and *A. maculipennis* are found in the first; *A. maculipennis* is the commonest in the second, but *A. mauritanus* and *A. algeriensis* also are met with; in Cyrenaica *A. maculipennis* and *A. multicolor* are seen but *Culicines* are more common, *Aedes argenteus*, *C. pipiens* and *T. longiareolata*. In the Ethiopian colonies, *A. mauritanus*, *A. gambiae*, *A. pharoensis* and others have been recorded in Abyssinia, but in Eritrea *A. mauritanus* is the only one known to the author; in Somalia, *A. costalis* and *A. funestus* are the chief.

H. H. S.

MANALANG (C.). **Morphology and Classification of the Philippine Variety of *Anopheles aconitus* Donitz, 1902, and *Anopheles minimus* Theobald, 1901.**—*Philippine Jl. Sci.* 1930. Oct. Vol. 43. No. 2. pp. 247–261. With 4 figs. on 1 plate. [28 refs.]

The author considers that the Philippine *Anopheles* which have been regarded hitherto as *A. minimus* are identical with *A. funestus* of GILES as amended by STRICKLAND, and that the local insects which have been regarded as a variety of *A. funestus* are a variety of *A. aconitus*; this variety he describes as new under the designation *A. aconitus* var. *filipinae* [sic]. A. A.

SCHIPITSINA (N. K.). **The Feeding of *Anopheles maculipennis* Larvae on the Colloids of Natural Water.**—*Bull. Inst. Recherches Biol. Univ. Perm.* 1930. Vol. 7. Pt. 4. pp. 171–190. [18 refs.] [In Russian. English summary pp. 190–194. With 4 curves.]

According to the English summary the main objects of the work here described are to determine: (1) whether or not larvae of *Anopheles maculipennis* can live and grow on the minute organic particles, chiefly colloids, of natural water, and (2) the quantity of water that a larva can strain through its mouth in a given time. Squads of 18 to 25 larvae were bred, under uniform conditions, in dishes each holding 80 cc. of water, of four kinds, namely: (1) the pond water of their local habitat, rich in minute and varied forms of seston* and dissolved organic matter; (2) the same water after passage through filter-paper, still containing bacteria and colloids, and dissolved organic matter; (3) the same water after passage through a Chamberland candle, still containing colloid particles and dissolved organic matter; (4) "artificial fresh water" containing "a poor quantity of organic substances and 787 bacterial colonies in 1 ccm." (Preliminary experiments had shown that larvae of the species studied swallowed particles of Chinese ink ($1\ \mu$ to $0.1\ \mu$) and of collargol.)

Larvae did not attain the fourth instar in any of the four media, their retarded growth and aborted fate being due to deficient food. Those in the restricted volume of pondwater naturally did better than those in the paper-filtered pondwater; and those in the Chamberland-filtered water, which contained only organic colloid particles, did better than those in the "artificial fresh water," which contained bacteria. The conclusion of the matter is that the organic colloids contained in water do contribute a distinct quatum to the food supply of the larva, but a quatum which—by experimental estimation of the amount of water that is passed through a larva's mouth in a given time—is not sufficient to sustain life. A. A.

VAN THIEL (P. H.). **Hibernation et semihibernation de l'*Anopheles maculipennis* et de la variété *atroparvus*; un problème de l'anophélisme sans paludisme. [Hibernation and Semihibernation of *Anopheles maculipennis* and the Variety *atroparvus*: Anophelism without Paludism.]**—*Bull. Soc. Path. Exot.* 1930. Oct. 8. Vol. 23. No. 8. pp. 836–850. With 4 text figs. [12 refs.]

In Holland two kinds of *Anopheles maculipennis* are recognized, namely: (1) the typical form, which is larger, longer in wing, and does not suck blood, but runs to a fat-body in winter, which it passes in a state of complete inactivity, in corn-lofts, coach houses and houses;

* Seston (σηστόν) = sifted, i.e. filtered matter.

and (2) a smaller shorter-winged form (*atroparvus*), which does suck blood from time to time, but has the fat-body incompletely developed, in winter, which it passes in a state of partial activity (semihibernation) in houses and cattle-sheds of populous places. The variety *atroparvus* breeds in brackish waters, predominates in malarious tracts, and is believed to be a more continuously persistent and therefore more dangerously efficient malaria carrier than the typical freshwater-breeding long-winged *A. maculipennis*. [This subject has been reviewed again and again in this *Bulletin*, the latest notice being in Vol. 27, pp. 910-911. It appears now to be approaching a stage that lies rather outside the purview of Medical Zoology.]

The present paper deals chiefly with detail of seasonal development of the fat-body of *atroparvus*, and draws attention to a "group" of insects which by their wing-index and hibernating-places should be identified with *atroparvus*, but approach the typical *maculipennis* in the seasonal development of the fat-body. A. A.

GRITZAI (P. K.). Biologie de l'*Anopheles maculipennis* Mg. et mesures antianophéliques à la station malarique de Charkow. [Biology of *Anopheles maculipennis* Mg. Antanopheline Measures at Kharkov.]—*Bull. Soc. Path. Exot.* 1930. Oct. 8. Vol. 23. No. 8. pp. 795-797. [Th. Iatzenko Inst., & Malaria Station, Kharkov.]

In antimalaria work in and around Kharkov in 1926-27 anopheline larvae were found to be particularly abundant in clean waters rich in Spirogyra. Real success against the larvae depends on radical treatment of rivulets, ponds, springs, and all little and temporary collections of water. Rectification of the beds of the rivers only resulted in the appearance of anopheles larvae there where they had not been found before—to the author's astonishment. For sheets of water Paris green is better than petroleum since it is not so hurtful to forms of life other than *Anopheles* larvae. The presence of stabled cattle was found to mitigate the incidence of malaria. A. A.

MASSLOW (A. W.). Zur Biologie der *Anopheles maculipennis* Mg. [Biology of *Anopheles maculipennis*.]—*Ztschr. f. Angewandte Entomol.* 1930. Aug. Vol. 16. No. 3. pp. 592-596. [1 ref.]

An unexciting diary of the winter life of *Anopheles maculipennis* in Tomsk (Siberia). One observation of general interest is that the average length of life of the insects (16) resting on damp walls (90 per cent. moisture) was 56.4 days, whereas that of the insects (10) resting on dry walls (35 per cent. moisture) was only 12.5 days. A. A.

SHANNON (Raymond C.). Observations on *Anopheles pseudopunctipennis* in Peru.—*Amer. Jl. Hyg.* 1930. Sept. Vol. 12. No. 2. pp. 442-448. [15 refs.]

Observations of *Anopheles pseudopunctipennis*, chiefly in the Rimac Valley in Peru. It is the only species that occurs there, and, probably, on the entire western slopes of the Andes. It has been found at an elevation of 7,800 feet. It is also abundant, in July, in one region on the eastern side. [It is known to be a highly efficient carrier of malaria in N.W. Argentina, and a carrier in Mexico. In N.W. Argentina it does not hibernate; in the lowlands all breeding-places dry up in the dry season, so that it can breed, except possibly in occasional springs, only in the rainy season; in the mountains it is forced to breed in the scanty permanent springs.] A. A.

PEREZ (Manuel). **An Anopheline Survey of the State of Mississippi.**—*Amer. Jl. Hyg.* 1930. May. Vol. 11. No. 3. pp. 696-710. With 4 maps & 3 figs.

This paper gives graphic illustration of the distribution within the State of the 3 local species, *A. quadrimaculatus*, *A. punctipennis*, and *A. crucians*.

A. A.

BONNE (C.). Voortleven van Anopheleslarven in vochtige aarde. [**Survival of Anopheles Larvae in Humid Soil.**]—*Geneesk. Tijdschr. v. Nederl.-Indië.* 1930. Aug. 1. Vol. 70. No. 8. p. 804.

In connexion with the observation of KAISER (see this *Bulletin*, Vol. 27, p. 904) on *Anopheles* larvae in an intermittent swamp, Bonne remarks that he saw a similar condition in Panama.

W. J. Bais.

WELLS (Clifford W.). **The Identification of the Anopheline Mosquitoes of Porto Rico.**—*Amer. Jl. Trop. Med.* 1930. July. Vol. 10. No. 4. pp. 243-248. With 5 text figs. [2 refs.]

Describes and figures the features, particularly of the clypeal, antennal, and anterior submedian thoracic hairs, by which the larvae of the Porto Rico species of *Anopheles*—*albimanus*, *grahamii*, and *vestitipennis*—may be distinguished *inter se*.

A. A.

DE MEILLON (Botha). *Anopheles funestus* (Giles) in Smoke-Filled Native Huts.—*Jl. Med. Assoc. South Africa.* 1930. Nov. 22. Vol. 4. No. 22. p. 693. [South African Inst. for Med. Research, Johannesburg.]

Observation of *Anopheles funestus* in native huts reeking with smoke and in huts where a fire had been burning nearly all night and most of the morning.

A. A.

ORLOWA (A. A.) & SCHACHOW (S. D.). Culicidae und Phlebotominae des Bezirkes Kaarry-Kala in Turkmenien. [**Culicidae and Phlebotominae of the Kaarry-Kala District of Turkmenistan.**]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1930. Nov. Vol. 34. No. 11. pp. 593-608. With 12 text figs. [28 refs.]

An account of the findings in May-September in the southern Turcoman country, about N. lat. 38°. *A. plumbeus* (along with *Aedes pulchritarsis* and *Ae. geniculatus*) in rot-holes, *A. bifurcatus*, *A. maculipennis*, *A. elutus*, *A. superpictus*. *Phlebotomus papatasi*, *P. sergenti* and varr., *P. major*, *P. minutus* and varr., *P. perniciosus*.

A. A.

LLOYD (R. B.) & NAPIER (L. Everard). **The Blood-Meal of Sandflies investigated by Means of Precipitin Antisera.**—*Indian Jl. Med. Res.* 1930.² July. Vol. 18. No. 1.st pp. 347-359. With 3¹ graphs. [1 ref.]

In these observations, which were maintained for a term of two years and two months, there were tested 909 specimens of *Phlebotomus*

argentipes, 205 of *P. minutus*, and 34 of *P. papatasii*—collected from all sources. Human and bovine blood was detected in 261 *P. argentipes*, in 32 *P. minutus*, and in 4 *P. papatasii*; human blood alone in 25 *P. argentipes*, in 26 *P. minutus*, and in 1 *P. papatasii*; bovine blood alone in 609 *P. argentipes*, in 84 *P. minutus*, and in 29 *P. papatasii*. Precipitin tests were made with powerful highly specific antisera, the action of the antisera (in high dilution) being fully tested on controls. The following is the authors' own summary of results and conclusions:—

"1. The gut contents of sandflies (*Phlebotomus argentipes*) that have at some time during their life fed on human blood gave a positive reaction with anti-human precipitating serum in 88 per cent. of cases. Within the time limits examined it appears to make no difference whether the meal is recent or not; in two flies a positive reaction was obtained eight days after the human feed, a remarkable result in view of the digestion which must have occurred.

"2. *P. argentipes* and *P. papatasii* feed almost exclusively on the blood of cattle or man. *P. minutus* also usually feeds on the blood of cattle or man, but also quite frequently on the blood of other species. *P. minutus* is a more persistent human-blood feeder than *P. argentipes*, and *P. papatasii* feeds on human blood less readily than the other two species.

"3. *There are marked seasonal variations in the feeding habits of the flies. A graph representing the percentage of human feeds shows a rise in the hot weather (April to June) and a second more distinct rise in the autumn; the latter rise can be explained on the ground that the rainy season (July to September), which precedes this rise, provides the most suitable conditions for ensuring longevity in the sandfly.

"4. *No special difference in the feeding habits of flies in different localities was observed.

"5. *Confirmation was obtained of our previous finding that when the blood of cattle and man are both available the flies feed more readily on cattle.

"6. *The percentage of flies containing human blood appears to vary in inverse ratio to the distance of human sleeping quarters from the cattle shed where the flies were caught.

"7. Our observations provide but little evidence in favour of the sandfly theory of kala-azar transmission, except that in nature *P. argentipes* is a persistent human-blood feeder, and that the percentage of flies containing human blood reaches its highest point at the time of the year when the flies are most numerous, viz., in the autumn. These facts are in keeping with the cold weather rise in the kala-azar incidence curve."

A. A.

NAPIER (L. Everard). **The Artificial Feeding of Sandflies.**—*Indian Jl. Med. Res.* 1930. Oct. Vol. 18. No. 2. pp. 699–706. With 2 text figs. & 3 figs. on 1 plate. [2 refs.] [School of Trop. Med. & Hyg., Calcutta.]

About five-sixths of this paper is taken up with a description of an apparatus for artificial feeding of sandflies, of which the essential parts are a device for clamping and a capillary pipette for feeding the fly; but the instructions for making the apparatus and for its successful management in the operations of feeding the insect are too full of minute attention to detail to be treated summarily.

In the artificial feeding experiments, when condensation-fluid from NNN culture tubes of *Leishmania* was used *alone* for feeding the flies,

* These conclusions refer to *P. argentipes* only.

it was found in the large majority of cases that development of flagellates did not result ; but that when washed red blood corpuscles were added to the condensation-fluid development occurred. Thus, of 25 *Phlebotomus argentipes* dissected 48 hours or more after an initial feed of fluid from cultures of *L. donovani* only 1 contained flagellates, whereas of 73 fed on the culture-fluid *plus* washed red corpuscles 47 became infected—both male and female insects. Again, of 12 *P. argentipes* fed only on culture-fluid of *L. tropica* none contained flagellates, whereas of 27 fed on the culture fluid *plus* washed red corpuscles 17 became infected. (In the cases of *P. minutus* (=babu) and a few *P. papatasi* fed on cultures of *L. donovani* mixed with washed red blood corpuscles no development of flagellates resulted in the flies.)

A. A.

SHORTT (H. E.), SMITH (R. O. A.) & SWAMINATH (C. S.). **The Breeding in Nature of *Phlebotomus argentipes*, Ann. & Brun.—Bull. Entom. Res. 1930. Oct. Vol. 21. Pt. 3. pp. 269-271.**

The object of this investigation is to acquire the exact knowledge necessary for the location of the breeding-places of the species of *Phlebotomus* in towns and villages in Assam with a view to despoiling such breeding-places. It is known that the soil fit for the larvae must contain organic debris for food, that it must be loose enough to permit the larvae to burrow freely for their food, and that the site must be sheltered both from casual wetting and from flooding and from desiccation by sun and wind. Such soil and such sites are to be found in Assam on the sheltered sides of the mud plinths of houses and cattle-sheds, in the corners of rooms and where the walls meet the floor, and in heaps of organic debris, old bricks, piled logs, and miscellaneous rubbish lying round about habitations. The soil and dust in suspicious places of this kind must be carefully investigated and searched for larvae and pupae (the eggs being too small for detection on this scale). The authors describe how in convenient samples (3 lb.) the suspected soil is well washed in a basin of water and how the suspension is passed repeatedly through sieves (10, 20, 40, 60 meshes to the inch) until nothing is left on the last sieve but a fine deposit, including the fauna in the original soil. This deposit is carefully washed off into a white developing-dish, where the supernatant fluid is syphoned off and replaced by a saturated solution of white sugar. When the deposit has been stirred into the sugar solution the mixture is allowed to settle, and when it settles all insect-larvae, acarines, nematodes, etc., will have been floated to the surface, where *Phlebotomus* larvae and pupae may be searched for with a hand lens

A. A.

ADLER (S.), THEODOR (O.) & LOURIE (E. M.). **On Sandflies from Persia and Palestine.—Bull. Entom. Res. 1930. Dec. Vol. 21. Pt. 4. pp. 529-539. With 2 text figs. & 5 figs. on 2 plates. [14 refs.] [Hebrew Univ., Jerusalem.]**

The *Phlebotomi* were collected between May 27th and July 3rd¹⁹³⁰ in the northwest corner of Persia, in towns along the motor-route Khani-kin-Kermanshah-Teheran-Kazvin-Enzeli, the Teheran and Kazvin

district being the heaviest centre of cutaneous leishmaniasis, human and canine, in Persia. The species are *P. papatasi*, *P. sergenti* of Parrot, *P. caucasicus* of Marzinovski, *P. chinensis*, *P. kandelaki*, *P. perniciosus* var. *tobbi*, *P. wenyoni*, and *P. tiberiadis*, the last two species and the preceding variety being "new" and *P. chinensis* being the first record from Persia. Attention is drawn to "the quite distinct and well-defined hours of activity of the different species." *P. perniciosus* var. *tobbi* is stated to have been infected by feeding on cultures of *Leishmania donovani* of Mediterranean origin, and *P. caucasicus* by feeding on cultures of *L. tropica*. Some species of *Phlebotomus* can be bred even on long motor journeys, in earthenware vessels. The vessel containing the insects is closed with muslin over which a lid is tied; the vessel is then buried in a wooden box filled with moist earth; some shafts are then sunk in the earth almost to the bottom of the box (to receive water as required). Or, the earthenware vessel may be simply wrapped in cottonwool or lint kept slightly moist. If any eggs are found when the vessels are examined from time to time, some earth and rabbit-dung can be put in the vessel.

A. A.

PARROT (L.). Notes sur les phlébotomes. III. 1. Sur *Phlebotomus sogdianus* n. sp. 2. Morphologie et répartition géographique de *Phlebotomus parroti* Adler et Theodor. 3. Présence de *Phlebotomus sergenti* dans le Sahara central. [Notes on *Phlebotomus*. III. 1. *Phlebotomus sogdianus* n. sp. 2. Morphology and Distribution of *Phlebotomus parroti* Adler & Theodor. 3. Presence of *Phlebotomus sergenti* in Central Sahara.]—*Arch. Inst. Pasteur d'Algérie*. 1929. Sept.-Dec. Vol. 7. No. 3-4. pp 303-309. With 3 text figs. [10 refs.] [Pasteur Inst. of Algeria, Algiers.]

1. Having had an opportunity of examining the pharynx and spermatheca of the *Phlebotomus* described by him in 1928 as *Phlebotomus minutus* var. *sogdianus*, from Bokhara, Parrot now considers it to be a new species; the structures in question are now figured. 2. A distinctive detail in the form of the penis of the N. African *P. parroti* is described and figured. 3. The specific diagnosis of *P. sergenti* of Parrot (now reported from the central Sahara) is confirmed.

A. A.

SINTON (J. A.). Some New Species and Records of *Phlebotomus* from Africa.—*Indian Jl. Med. Res.* 1930. July. Vol. 18. No. 1. pp. 171-193. With 48 figs. on 5 plates. [73 refs.]

This paper contains a useful list of the species of *Phlebotomus* recorded from Africa, with detail of the known geographical range of each. It also contains descriptions and anatomical illustrations, and along with them in each instance a brief differential diagnosis, of the three following species determined by the author to be new to knowledge: (1) *P. symesi* male and female represented by 3 males and 13 females, from Mombasa. (2) *P. yusafi* male and female, represented by 1 male and 2 females, also from Mombasa. (3) *P. freetownensis*, represented by a single female from Sierra Leone. The author makes mention of about 50 specimens of a species from Mauritius (collected by Major W. F. M. LOUGHNAN, M.C.) found on close examination to be identical with *P. babu*, a common Indian species.

A. A.

REVIEWS AND NOTICES.

LAING (Frederick). **The Cockroach : its Life-History and how to deal with It.**—*British Museum (Natural History) Economic Series No. 12.* 2nd Edition. 23 pp. With 3 figs. on 1 plate and 4 text figs. 1930. London; Printed by Order of the Trustees of the British Museum. [6d.]

The first edition of this little book of the cockroach was noticed in this *Bulletin*, Vol. 19, p. 899. Here after eight years we meet the cockroaches again—the Common cockroach (*Blatta orientalis*), the little German cockroach (*Blattella germanica*), the large American cockroach (*Periplaneta americana*), and the Australian cockroach (*P. australasiae*)—and are glad that we do not find any new species or varieties among them. In the last three species the colour is not dark brown and the adults in both sexes have fully developed wings, and wing-cases that completely cover the abdomen; but in *B. orientalis* the colour is very dark brown (hence the household name “blackbeetle”), the wing-cases in the male do not cover the abdomen entirely, and the wings of the female are almost rudiments. The small changes in the present edition are largely of academic interest and relate to such matters as the span of adult life, the exact duration of post-embryonic development, the effects of a laboratory diet, etc.—matters of minor concern to those whose chief business with these disgusting yet interesting insects is either to banish them from our storerooms and culinaria, or to tap them for their wealth of intestinal protozoa. We may notice with satisfaction that the span of life of *B. orientalis* has been shortened by laboratory observations; at a summer temperature (73° F.) the normal term of the egg-stage is said to be from 2 to 3 months, and of the whole post-embryonic development 9 months to about a year; but at lower temperatures development would be expected to be slower. *B. orientalis* produces a large number of egg-packets, with an average of about 16 eggs in each. *B. germanica* has 28 to 56 eggs in a packet, and some authorities say that the mother dies after depositing one packet, others say that she deposits at least two, and she is said to have some affection for her progeny; the growth of this species is comparatively quick—68 to 94 days from hatching to adult at a temperature about 73° F. The American cockroach, which is about 1½ inches long, is particularly associated with ships and warehouses; its average production of egg-packets is about 25, each holding 14 to 28 eggs; the normal life of the adult female is from one to two years, of the adult male considerably less. The Australian cockroach is distinguished by the yellow ring on the first thoracic segment and the yellow streak on the side of the wing-cases; it is said to have not established itself in the dwelling-house.

To extirpate the cockroach many methods are given. Of *Powders*, a mixture of 3 parts sodium fluoride and 1 part pyrethrum, which must not be allowed to get on *our* food; or of borax and sugar; or of Plaster of Paris 1 part and sugar 2 parts. *Pastes* of phosphorus or of red lead, spread on paper or on card, are good if they can be used with perfect safety to other animals. Of *Sprays*, a (decanted) infusion made by soaking ½ lb. of pyrethrum powder in a gallon of paraffin, or Carbon tetrachloride may be used as a spray. Of *Traps* and baits much is said; their success depends upon the bait; “many of the traps on the market are good”; greasy or sticky preparations spread on card and baited also are mentioned. *Fumigation* with SO₂, CS₂, and HCN, and the resort to heat in buildings where steam is fitted and the general temperature can be kept for some little time at 130° F. are major operations. The booklet is very nicely illustrated and is in truth a valuable sixpennyworth.

A. Alcock.

BUREAU OF HYGIENE AND TROPICAL DISEASES.

TROPICAL DISEASES BULLETIN.

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[No. 7.

MEDICAL ZOOLOGY.

TAYLOR (A. W.). *Glossina palpalis* and Sleeping Sickness at Ganawuri, Plateau Province, Northern Nigeria.—*Bull. Entom. Res.* 1930. Oct. Vol. 21. Pt. 3. pp. 333-340. With 1 map in text & 12 figs. on 3 plates. [2 refs.]

This is an admirable account of a recent epidemic of sleeping-sickness in the Ganawuri villages of the Bauchi plateau in N. Nigeria. The existence of the infection among the pagan tribes of the plateau has been discovered only in recent years, but *G. palpalis* is present, to some extent, in places where heavy shade and the requisite food supply are concurrent. The situation and climate, the natural water supply, the distribution of forest, the population and its pursuits, the local distribution of the fly and its high infection-rate (as determined by dissection of about 300 flies) are all pictured and are brought to a focus in the appended summary. Radical measures for breaking "the existing tsetse-man contact" were difficult. Since the cost of preventive clearing would have been prohibitive, even had labour been at hand, and even if the pious concern of the pagans for their sacred groves could have been ignored, the only alternative was to remove the entire population of the infected hill-villages to the tsetse-free river-plain at a convenient distance below. To this alternative measure the village headmen were gently persuaded in the end.

The following is from the author's own summary:—

"The absence of game and aquatic reptiles, the normal buffers between *G. palpalis* and man, has resulted in the fly obtaining a large proportion of its food from man. There is also in the district localisation of shade suitable to *G. palpalis* in, and in the very near vicinity of, the Ganawuri villages. The combination of these two factors has produced an extraordinary degree of intimacy of contact between tsetse and man, and the introduction of a virulent strain of *T. gambiense*, probably from Jemaa, has resulted in the present severe epidemic. Transmission of the disease is by cyclically infected *G. palpalis*, and the high infection rate in the fly makes up for its low rate of abundance."

A. A.

LESTER (H. M. O.). **Report of Tsetse Investigation, 1929.**—*Ann. Med. & San. Rep. Nigeria*, 1929. Appendix B. pp. 31–49.

The report deals with experimental clearings of forest, experimental infection of tsetse and other flies, the adhesion test applied to cattle, and the Ganawuri sleeping sickness epidemic. The clearings at Sherifuri over a tract of nearly 72 square miles and the banks of sixty miles of meandering water courses, although not without effect on the fly (*G. morsitans* and *tachinoides*), are not sufficiently striking to justify their extension so long as they are not being occupied by settlers; they are, however, to be maintained. Those around the Matyoro Lakes, 6½ miles in extent, have been considerably settled and are "more prosperous." The chief anxiety here is recuperation of palustrine fig, regrowth of which starts from bits of twig or even from chips of bark; this is being countered by raising the level of the water of the marshes a few feet. Clearing by delayed burning at Sherifuri has certainly thinned *G. morsitans* there for the present, but after four years' experience is to be discontinued, since results do not justify expense.

Study of factors influencing the trypanosome infection-rate in tsetse-flies is described in some detail. In transmission experiments where 355 laboratory bred *G. tachinoides* were fed on a single laboratory strain of *T. brucei* 1·1 per cent. of flies became infected, and where 277 were fed on two strains of *T. brucei* 7·9 per cent. became infected. The difference in the rate in the two series is shown to be due not to temperature; it is suggested that it might be due to mixing of strains of the trypanosome, or to varying nutrition of flies after the infective feed, or to variation in the degree of concurrent bacterial growth in the gut of the flies [see TAYLOR & LESTER, *ante*, p. 368]. Studies of the direct mechanical transmission of *T. brucei* and *T. gambiense* by *G. tachinoides* are described [see TAYLOR, *ante*, p. 367].

In the application of the adhesion test to demonstrate chronic trypanosomiasis in Fulani cattle (taken at random from the herds) of 503 beasts tested against *T. brucei* 9 were positive, and of 503 tested against *T. congolense* 86 were positive. In the case of Pagan cattle, of 125 beasts tested against *T. brucei* 11 were positive, a rate (8·8 per cent.) that approximates to that of wild game in the district.

The work of Divisional Sleeping-Sickness officers is briefly abstracted, and the Ganawuri epidemic—which has already been noticed—is shortly described.

A. A.

NASH (T. A. M.). **A Contribution to our Knowledge of the Bionomics of *Glossina morsitans*.**—*Bull. Entom. Res.* 1930. July. Vol. 21. Pt. 2. pp. 201–256. With 8 text figs. & 1 coloured folding map. [5 refs.]

The author is in charge of the Kikori Entomological Station, Tanganyika Territory, lying in the densest part of the Kondoa eastern tsetse-fly belt, west of the Masai steppe. Kikori is an excellent locality for studying the bionomy of *Glossina morsitans*—the fly is abundant, game is plentiful, and in a small compass the "type" of vegetation ranges from hill forest to open grassy plain. In this report are described: (1) the local environment of the fly—main types of soil, climate and seasons, vegetation communes, game-distribution; (2) the methods and results of survey by "fly-rounds"; and (3) certain

studies in the insectary, field, and laboratory—the last being to gain some knowledge of the relative importance of the eyes and antennae of *Glossina*. A “fly-round,” it should be explained, is not the volatile affair that the name suggests; it is a very careful study of the fly in its environment, made at short intervals throughout the year, along a fixed route, the several routes being fixed so as to tap all the main “types” of the local vegetation. The following is the author’s concept of a Fly “Community” (*G. morsitans*) based upon the surveys and studies here described in full detail:—

“The true habitats of the fly coincide with the major breeding sites; they are characterised by perennial, if variable, shade and poor visibility. In the Eastern Kondoa Fly Belt, the *Berlinia-Brachystegia* wooding and small thickets form such habitats.

“Fly multiply during the favourable season that follows the rains. When the sky is cloudy, and even the savannah shrubs are green and umbrageous, tsetse are scattered throughout the bush.

“Fly are scarce during the unfavourable dry season. They concentrate within their true habitats, when the open country is leafless. The *Berlinia-Brachystegia* woods are considered to be the centres from which the fly advance or to which they retreat, according to the season.

“The open ‘mbugas’ are the feeding grounds for both sexes of fly. At no season do they form a habitat. Hungry fly leave the shade of the woods and rove through the open ‘mbuga’ searching for game; the good visibility of such country is well suited to insects which appear to hunt by sight.

“It is believed that tsetse do not fly through the bush until attracted by a moving object, but that they definitely hunt, following paths and visiting recent haunts of game. Having fed, the fly make for the nearest stand of shady woods and there digest. There is no indication that fly return to the same habitat after each meal. Should there be no open country, then a road may form a feeding ground. These areas can be recognised by the relatively high female percentage and the starved condition of the fly. The tsetse taken in the true habitats have a very low female percentage and are well fed. These woods, however, are not considered to be male areas. Females are believed to be as abundant as males within the true habitat; however, they are inactive between meals, and usually only fly when hungry and in need of food.

“Males are considered to be attracted by movement alone, whereas females need this tropism, as well as that of hunger. This reluctance on the part of the females is considered to be engendered by their fear of assaults from males. It is a common sight to see a female attacked by several males, which will grapple and force her to the ground, where the fight for possession may last for some seconds. In very dense fly, such as is usually found in the true habitats, a female may be attacked by as many as five individuals of the opposite sex. In belts of thin fly the female inactivity is not nearly so marked.

“*G. morsitans* is sometimes found in exceptionally large numbers in certain woods. A particularly suitable environment may attract many individuals until an aggregation is formed; however, no evidence can be found to show that such a community is of a social nature.”

A. A.

JACKSON (C. H. N.). *Contributions to the Bionomics of Glossina morsitans*.—*Bull. Entom. Res.* 1930. Dec. Vol. 21. Pt. 4. pp. 491–527. With 4 text figs. (1 map). [10 refs.]

The author recounts, in a circumstantial detail that is occasionally perhaps a little overcharged, his ideas and procedure in investigating

the country roundabout Sambala (in Tanganyika Territory) infested with *Glossina morsitans*. Having realized with a veteran conviction that the naturalist's first step in studying the biology of a particular species is to get an enlightened knowledge of its environment throughout the seasons, and that this is only acquired gradually by regular and repeated perambulations, he has mapped his field of observation in plots for periodic traverse, the plots being characterized severally by some obvious natural feature—type of forest, attractiveness for game, game-tracks, waterholes, etc. By this continuous method he has not only studied the topographical distribution, movements, and seasonal variation in numbers and condition of the fly, but also has collected and systematized a large amount of information about the physical features, the flora, the fauna, and the movements and habits of the large game of its environment. In his analysis of the fly-people (*G. morsitans*) the author distinguishes: (a) "female centres," anigh waterholes and well-beaten game-tracks, characterized by high percentage of female and a relative abundance of young (unfed) flies; a more or less steady stream of flies to these centres has been observed; (b) larger "male areas," commonly spread over large tracts of Berlinia-Brachystegia forest, where the percentage of females is "appreciably lower"—"this sex being practically absent except towards the end of the dry season"—and young (unfed) flies are scarce; (c) "spread centres" of still larger extent, with "apparently dense fly and high female percentage"; (d) "scarce-fly areas" at the limits of the range. "Investigation by field experiments and other methods has led to the conclusion that the 'female centres' and 'spread centres' are most probably feeding-grounds of fly, and that the 'male areas' are its home."

A. A.

JACK (R. W.). **Some Aspects of the Tsetse Fly Problem in a Colony developing on the Basis of European Settlement.**—*Pan-African Agric. & Vet. Conference, Pretoria, 1-17 Aug., 1929 (Papers Vet. Sect.)*. pp. 16-22.

During the last century tsetse-fly (chiefly *morsitans*) disappeared from the southern part of the colony (S. Rhodesia) and became scarce in the northern part; during the past 30 years, however, it has been steadily re-invading the northern area, where it now occupies fully 18,000 square miles of country, and is continuing to spread southwards on a front of more than 600 miles. The present paper is a reasoned argument on the question of how this impending menace to the southern country is to be faced. The most urgent aspects at present are to save from evacuation certain areas in European occupation that are already affected by the fly, and to prevent invasion of Native Reserves. Destruction of essential retreats of the fly is not generally applicable; moreover, reluctance to destroying shade is frequently expressed. The effect of clearing forest is insignificant; moreover, it is the protection of agricultural settlements that is the pressing need. About the effect of reduction of game, however, there is local unanimity; the effect may be slow, but it is perceptible. The immediate policy in Southern Rhodesia to-day, therefore, is to concentrate "on reducing the game as much as possible all along the edge of the fly-infested country"; to create and maintain game-free zones ten miles or more wide beyond the farm boundaries; and to control motor traffic of hunters and pros-

pectors. Entomological and biological research must, of course, be more facilitated than it has been hitherto.

A. A.

JACK (Rupert W.). **Tsetse Fly : Traffic Control.**—*Rhodesia Agric. Jl.* 1930. May. Vol. 27. No. 5. pp. 493–501. With 3 figs. on 1 plate.

This deals with the working of the Act for checking the spread of tsetse fly (*G. morsitans*) along lines of traffic in Rhodesia. There are two lines where fly-country is close enough to settled land to make the risk from transported flies a danger to graziers. The fly (both sexes) has a tendency to follow moving objects and to settle on the backs of pedestrians and cyclists and under the hoods of motor-cars. On pedestrians it may be carried perhaps as far as 10 miles, and on speeding motor-cars perhaps as far as 50 miles. When the moving object stops the flies move off and seek shade near by.

Any attempt to control pedestrians is considered to be impracticable, but vehicles (including cycles) leaving fly areas are restricted to fixed routes. Here at the points of exit there is a notice stating that motorists and cyclists are required to submit to certain prescribed measures, applied by the native police guard. Alongside the exit-gate is a hut for fumigating the vehicle, with at one end a mosquito-gauze anteroom for clearing the occupants of the vehicle of fly. On reaching the exit-gate the vehicle is passed through that end into the hut, the passengers alighting in the anteroom, where they are groomed with insect-nets while the vehicle is being fumigated in the hut itself, and also searched for skulking flies with insect-nets. Fumigation with wood-smoke has been found unsatisfactory, sulphur, of course, is out of the question, and in the circumstances CS_2 and HCN are unsafe; therefore in the present experimental stage "flit" and "komo" are being used. When all is done and the guard is satisfied that all transported flies have been destroyed, the vehicle is passed out of the fly area through the far end of the hut. Native cyclists are cleared of fly in special gauze cages.

A. A.

JACK (Rupert W.). **Pan-African Agricultural and Veterinary Conference, Pretoria, August, 1929. Discussions concerning Game Preservation, Trypanosomiasis and Tsetse Fly.**—*Rhodesia Agric. Jl.* 1930. Aug. Vol. 27. No. 8. pp. 827–840.

The preoccupation here is chiefly animal trypanosomiasis. The Conference allowed that existing species of mammals should be specially preserved, but resolved unanimously that no such preservation should be permitted in settled tracts where tsetse-flies are a constant menace to stock. In the ensuing discussion MARSHALL dissented from block clearance of forest, but thought that the making of "island" clearings in a fly-infested forest might be effective. He, as well as SMITH and MACDONALD, emphasized the importance of control of motor traffic from fly-belts, the last speaker stating "that he had seen vehicles bearing literally hundreds of flies a distance of sixty miles from the nearest defined belt." CARMICHAEL reminded members of the possible transmission of trypanosomiasis by other sanguisugous flies in tracts free from tsetse. Jack drew attention to two important points, namely

the great expense of big clearing for settlement, and the fact that at present the colony was most concerned with checking the continuous encroach of the fly on already settled areas—"the fly is quite capable of over-running an additional ten miles or more of the country on a broad front in a single year if conditions are sufficiently favourable."

A. A.

HARRIS (R. H. T. P.). Report on the Bionomics of the Tsetse Fly (*Glossina Pallidipes* Aust.) and a Preliminary Report on a New Method of Control, presented to the Provincial Administration of Natal.—75 pp. f'cap. With 15 illustrations. 1930. June. Pietermaritzburg: Natal Witness Ltd., Printers.

This document is of two parts: the first relates to the control of *Glossina pallidipes* in Zululand, the second is a long report mainly on the bionomy of that insect. In the first part the author states, of the particular tracts in consideration, that the invasion of its settlements by the fly is primarily due to unrestricted increase of large animals in neighbouring game-reserves in fly-infested country and the consequent spread of the surplus game (carrying the fly with it) towards the settlements. If selection were made among animal-species thought worthy of special protection by the State, and the less worthy sorts, such as zebra and wildebeest, were excluded, the select residue, freed from competition, would be unlikely to stray beyond their bounds in the fly zone. The comparatively slow rate of increase of the fly is the next point. Systematic and persistent persecution of such slow-breeding females might be expected to subdue the species. The author has already reported (see this *Bulletin*, Vol. 21, p. 435) how *G. pallidipes* is attracted to large animals and to decoys or dummy animals, and in his early attempts to destroy the fly on a large scale he used oil poisoned with pyrethrum, or veratrin, or delphinin, smeared on cattle and decoys. But although flies were killed by this method the poison was rubbed off as the grazing cattle wandered in high grass, and in any case did not retain its virulence after 48 hours exposure. Poisons not succeeding, the author's thoughts turned towards large-scale trapping, as is noticed in the second part of this paper. In the traps latest devised, he seems to have discovered a promising method of checking the increase of *Glossina pallidipes*. In the course of 24 days trial 2,997 fly—2,516 female and 481 male—were taken in a single trap. The daily catch of course depends on weather; 1,326 of the above total were taken in five fine days; in three foul days only 6 were caught.

The second part of the paper, on the bionomy of *Glossina pallidipes*, contains a good deal of matter that has already been summarized in this *Bulletin* (see Vol. 21, p. 435, Vol. 24, p. 892, and Vol. 25, p. 828) and now need not be repeated. Here the author tells at great length how the idea of trapping the fly originated in observation that the hungry insect (as well as some other bloodsucking muscoids and some tabanids) in alighting on an animal always pitched on the animal's legs and belly. This was found also to be the case when a decoy or dummy was substituted as bait. The decoy might be of the rudest make, even with a large sheet of board covered with sackcloth and set up on edge about two feet above the ground on two sticks for legs in a good light—a mere adumbrative pretence of a large animal—the fly in guileless indifference to its other properties always pitched within 2 or 3 inches of its lower edge. Thus the author's earlier observation

that the insect goes for its victims by sight—or, rather, by some particular shadowy attraction—and then tests their food value with its proboscis, seemed to be confirmed, and led to a line of experiment with traps.

In his field-laboratory the author noticed among other things a chirruping noise made by the female immediately after birth of a larva ; a high-pitch " call " note suddenly emitted by a fly and sometimes answered ; that flies would test things with their proboscis without sucking, and showed no desire to feed on a stunned python, a large sphyngid caterpillar, a cane-rat, and a baboon ; but would suck even poisoned fluids if served beneath absorbent paper or cloth. Of laboratory-bred flies the three oldest males lived 135, 91, and 83 days, and the three oldest females 163, 151, and 114 days. The largest number of larvae born to one mother was nine. The average term of gestation ranged from 9 to 12 days in January and February to 18 to 21 days between May and August. The average term of pupation ranged between 22 days in December and 66 days in June. Once when the temperature in the laboratory rose to 110° F. all the flies died.

In nature the fly keeps covert, unless attracted to objects in the open, within its range of vision ; so, although it is not seen in the open country, it can travel far along a broken stretch of covert. Its breeding-places are among clumps of evergreen bushes, thickets, and evergreen undergrowth of shady trees—places where there usually is checkered shade, a light dry friable soil, an adjacent game-track, and some amount of open aspect ; they may be on banks of streams or not, or among rocks and boulders ; usually the puparia are " just covered by the soil beneath the leaf-carpet."

The author has some remarks on clearing, firing, and fencing in Zululand. Clearing (see *Bulletin* Vol. 24, p. 892) for a width of 380 to 550 yards did not in his experience prevent the fly crossing an island of bush to which no large wild animals had had access for 2 years ; but it, as well as fencing, may be useful near settlements, to keep out wild animals that attract the fly. Firing, although the spread of fire is hindered in rugged land, also is useful to keep down undergrowth in prospective resting and breeding places of the fly.

A. A.

HARRIS (R. H. T. P.). **Report on the Trapping of Tsetse Flies.**—8 pp. With 4 illustrations. 1930. Pietermaritzburg : The Natal Witness, Ltd.

The author reverts to his observations that *Glossina pallidipes*, being first roused towards prospective prey by sight and then directed to a definite line of shadow, assaults the ventral aspects (belly and legs) of a large animal, and after satiation returns promptly to the light ; and he explains how these observations suggested the principles of a trap.

Imagine a shallow trunk, twice as long as wide, suspended lengthwise and vertically. Such an object with a little aid from art might [" so easy is a bush supposed a bear "] be an image or a simulacrum of a large animal. Imagine the sides of this suspended illusion to converge towards the mid-ventral line but (instead of meeting there) to remain slightly apart along their whole length, leaving a longitudinal mid-ventral slit ; the simulacrum is now a trap—or, rather, the anteroom of a trap. The flies enter the anteroom, and in the attempt to escape

from it they make for the light, which is furnished by a cage attached to the dorsum of the simulacrum, with its mouth opening into the antechamber.

The trap can be mounted on two legs, or suspended. Its most attractive covering material is said to be hessian; black material invites the flies, particularly the males, to rest on the outside; khaki, if not fast dyed, fades; white is no good. The traps, of course, must be set in places attractive both to large animals and to tsetse-flies. Since so much depends on clear shading they must not be set amongst foliage, but in a conspicuous place, where they cast their own shadow. The trap must be stood, or suspended, about 18 to 24 inches above the ground or above the top of long grass. Large catches, of course, are not to be expected in foul or windy weather—or from traps sheltered from the sun.

A. A.

PAPERT (J. L.). **Tsetse-Fly Survey of Zululand and Surrounding Territories.**—16th Rep. of the Director of Veterinary Services and Animal Industry, Union of South Africa, Onderstepoort, Pretoria. 1930. Aug. pp. 255–263. With 2 maps.

The subordinate staff in this survey consisted of six (afterwards increased to twelve) native "boys" familiar with the tsetse and its haunts and with the methods of tsetse-fly investigation. Donkeys and cattle were used as baits, and the procedure followed was to tether the animals in suspicious places, where the "boys" caught any flies that were attracted. The survey is reported in 10 sections, each dealing with a separate area in its topographical detail and with regard to its natural features, the occurrence of ngana, the presence of game, and the existence or propinquity of fly. Its interest is quite local.

A. A.

HEGH (E.). La lutte contre les tsé-tsés. Recherche des gîtes à pupes et destruction des pupes qu'ils contiennent. [**Wrestling with the Tsetse. Destruction of the Pupae in the Breeding-Grounds.**]—Bull. Agric. Congo Belge. 1930. June. Vol. 21. No. 2. pp. 405–411.

This paper sets forth in an infinity of detail a project for maintaining, around all the known foci of sleeping-sickness, a steady check upon *Glossina palpalis* by periodic destruction of pupae in places where the gravid flies deposit larvae. The plan is only *versus G. palpalis*, whose nurseries generally are restricted to dry crumbly soils near water; it would be useless against *G. morsitans*, whose nurseries are so much wider scattered. [The proposal is not novel.]

A. A.

BEDFORD (H. W.). **The Distribution of Tsetse-Flies in the Sudan.**—Bull. Entom. Res. 1930. Oct. Vol. 21. Pt. 3. pp. 413–415. With 5 plates (maps). [8 refs.]

This paper records the discovery by Mr. T. D. BAYNE of a tsetse-fly, authentically determined as *G. palpalis fuscipes*, in the Anglo-Egyptian Sudan. The few individuals seen were observed near Bilbibulo (Lat. 9° 58' N., Long. 34° 06' E.) on the north bank of the Khor Yabus, about 12 miles due west of the Abyssinian frontier and 4 miles west of Abongoro.

The Khor Yabus is here a perennial and well-shaded stream. Another locality suspected to harbour *G. morsitans* is the country north of the Yabus along the Sudan-Abyssinian frontier at least as far as Gallabat. A good feature of this paper are the five separate maps of the Anglo-Egyptian Sudan indicating severally the local distribution of the five species of tsetse-flies known to occur in the Sudan.

A. A.

GRAHAM-SMITH (G. S.). **The Oscinidae (Diptera) as Vectors of Conjunctivitis, and the Anatomy of their Mouth Parts.**—*Parasitology*. 1930. Oct. Vol. 22. No. 4. pp. 457–467. With 1 fig. & 1 chart in text & 9 figs. on 1 plate. [15 refs.]

Careful attention is here given to the small Muscoid flies—in particular those of the family Oscinidae—known in many parts of the world as “eye-flies” and “mango flies,” and to a lot of recorded evidence incriminating them in the transmission of conjunctivitis and possibly other diseases. A detailed and well-illustrated account is given of the Oscinid proboscis, chiefly from *Hippelates pusio*, describing the six large pseudotracheae with the free ends of their serried chitinous rings splayed outwards and upwards to form as many double-edge saws capable of scarifying the surface of an abrasion or of the intact conjunctiva and so assisting the entrance of pathogenic microbes.

A. A.

DAVIES (W. Maldwyn). **The Control of Warble Flies in North Wales.**—*Jl. Min. Agric.* 1930. Dec. Vol. 37. No. 9. pp. 862–870. With 2 figs. on 1 plate. [7 refs.]

This paper, though meant for the veterinarian and farmer, may perhaps have some interest for the medical man. It celebrates the toxic powers of a “wash,” or suspension, of powdered derris root for the subcutaneous maggots of warble flies. The wash consists of derris powder 1 lb. suspended in a solution of $\frac{1}{4}$ lb. of soft soap in a gallon of water. Several species of Derris (*Deguelia*) are said to be represented in the commercial root, but only three of them are said to be efficiently toxic and perhaps all of them are variable; the root therefore must be carefully selected. Its cost ranges from 2s. 3d. to 3s. 6d. per lb. The wash loses its virtue if kept longer than a day.

A. A.

PINTO (Cesar) & DA FONSECA (Flavio). **Novos hospedadores intermediarios da *Dermatobia hominis* (L. Junior, 1781) “Diptera. Oestridae.” [Novel Intermediary Hosts of *Dermatobia hominis*.]**—*Rev. Med.-Cirurg. do Brasil*. 1930. July. Vol. 38. No. 7. pp. 248–250. With 1 plate. [Oswaldo Cruz Inst., Rio de Janeiro.]

The paper contains a fine enlarged photograph of a *Sarcophaga terminalis* with a packet of eggs of *Dermatobia hominis* attached to its abdomen, and a chronological record of the observed intermediary hosts of the eggs of *Dermatobia*. The list of these hosts includes a *Culex*, *Janthinosoma lutzii*, *Psorophora posticata*, *P. tovari*, and *Goeldia longipes*, besides several not identified mosquitoes; *Musca domestica*, *Stomoxys calcitrans*, *Sarcophaga*, and 7 other species of flies; and the tick *Amblyomma cajennense*.

A. A.

LAAKE (E. W.) & CUSHING (E. C.). **Fly Trapping on the Ranges of the Southwest.**—*Jl. Econom. Entom.* 1930. Dec. Vol. 23. No. 6. pp. 966-972.

Report of a test of the value of trapping for screw-worm flies (*Cochliomyia macellaria*) on a stock-ranch in Texas. Traps at the rate of 1 to each 407 acres (about) were set over a typical ranch-area of about 200 square miles. Each trap was baited with 2 lb. fresh meat in 2 gallons water containing 8 cc. of nicotine sulphate (which aborts maggots without checking decomposition of meat). Flies were removed about every 6 weeks. In the course of about 33 weeks (March-November) 8,533 quarts of flies were thus removed. Among these flies (as determined from composite samples taken every 6 weeks from traps representing all parts of the area) more than 18 spp. were identified in the following percentage: *Cochliomyia macellaria*, 68.0 (64.3 per cent. female); *Phormia regina*, 16.8 (58 per cent. female); *Sarcophaga*, 7.4 (50 per cent. female); *Lucilia unicolor*, 6.2 (69.1 per cent. female); all other spp. 1.6 (females with 2 exceptions in enormous excess). The authors conclude that while organized fly-trapping gives promise of a distinct reduction in screw-worm, effective control can be brought about only in combination with destruction of carcasses and with the help, possibly, of parasites and predators of the flies.

A. A.

HASE (A.). Ueber ein einfaches und billiges Verfahren, Fliegenmaden zu züchten. [**A Simple and Cheap Method of breeding Fly Larvae.**]—*Zool. Anz.* Leipzig. 1930. May 1. Vol. 88. No. 9-10. pp. 286-287. [Summarized in *Rev. Applied Entom.* 1930. July. Vol. 18. Ser. B. Pt. 7. p. 156.]

Rearing of larvae of *Calliphora vomitoria* and other flies in hard-boiled eggs. A small hole is made at one end of the egg, a little water and a small fragment of decaying meat is put into the hole, and the egg is stood in a shady place. The flies are attracted by the smell of the meat and lay their eggs in the hole, and the issuing larvae feed on the egg, remaining inside its shell. A few drops of water should be introduced occasionally, or the egg be kept in a damp atmosphere. On one egg 100 to 150 larvae may, it is said, be reared. If the egg be stood in moistened sawdust the larvae eventually will pupate in the sawdust.

A. A.

BRAND (Alonzo F.). **Gastro-intestinal Myiasis. Report of a Case.**—*Arch. Intern. Med.* 1931. Jan. Vol. 47. No. 1. pp. 149-154. [3 refs.]

Case in a male infant of 15 months, a feeble rickety creature weighing but 19 lb. After 5 weeks' treatment for convulsions a fresh stool and a napkin were brought by the child's mother "alive with maggots" and also containing pupae; the maggots were identified as *Musca domestica*, the flies from the pupae as "*Stomoxys stabulans*" [? *Muscina stabulans*].

A. A.

MASSIAS (Ch.). Myiases humaines en Indo-Chine. Deux cas de myiase génitale chez la femme. [**Myiasis in Indo-China. Two Cases of Female Genital Myiasis.**]—*Bull. Soc. Path. Exot.* 1930. June 11. Vol. 23. No. 6. pp. 595-596. [4 refs.]

Two cases of myiasis of the genitalia by *Chrysomya bezziana*, in Annamite women. One was a young female with chronic gonococcal metritis, and

the maggots were tenacious in a foetid sore of the fourchette ; the other an old woman with a prolapsed abraded and foetid uterus, to the neck of which the maggots were attached. The author refers briefly to other cases of chrysomyiasis in Indo-China and elsewhere.

A. A.

SHREWSBURY (J. F. D.). **A Case of Human Intestinal Myiasis.**—*Brit. Med. J.* 1930. Dec. 20. p. 1043. With 1 fig. on plate facing p. 1052. [1 ref.]

A case of mild enteritis in an English child. During its course 4 larvae of the common midge *Anisopus* (*Rhyphus*) *fenestralis* were passed at intervals.

A. A.

WEBSTER (W. J.) & CHITRE (G. D.). **Observations on Rat-Fleas and the Transmission of Plague. Part II.**—*Indian J. Med. Res.* 1930. July. Vol. 18. No. 1. pp. 337–345. [6 refs.]

These observations record the detail of a rat-flea survey of the city of Bombay for the year beginning March 1929, and the following is the authors' summary of the results: *X. cheopis* and *X. astia* were widely distributed, the former being five to twelve times more numerous on *Rattus rattus*. *X. brasiliensis* was practically confined to the most rural area studied. No marked seasonal variation was observed. Of 4,459 fleas identified 69.6 per cent. were *X. cheopis*, 27 per cent. *X. astia*, 3.3 per cent. *X. brasiliensis*, and 0.1 per cent. Ctenocephalides. The gross flea-index of rodents examined was *R. rattus*, 4.4; *R. norvegicus*, 6.9; *Gunomys*, 9.6; all three species of *Xenopsylla* were found on each of those hosts. The *cheopis* index was slightly higher for *norvegicus* than for *rattus*, and lowest for *Gunomys*. The *astia* index for *norvegicus* was five times greater and for *Gunomys* fourteen times greater than for *rattus*. The approximate percentages of females were—*cheopis*, 40; *astia*, 60; *brasiliensis*, 35.

A. A.

WEBSTER (W. J.) & CHITRE (G. D.). **Observations on Rat-Fleas and the Transmission of Plague. Part III** [WEBSTER]. **Part IV** [WEBSTER & CHITRE].—*Indian J. Med. Res.* 1930. Oct. Vol. 18. No. 2. pp. 391–405. [11 refs.]; pp. 407–425. [5 refs.] [Haffkine Inst., Parel, Bombay.]

The observations here recorded were made in Bombay.

The authors' brief summary of Part III states that all three rat-species of *Xenopsylla*—*X. cheopis*, *X. astia*, and *X. brasiliensis*—feed on man in the absence of a more suitable host—even at temperatures above 80° F.; that no striking difference has been observed in the longevity of starved individuals of the three species; that the developing stages of the fleas may survive temporary exposure (24 hours) to extreme temperatures of 98.4° F. and 40° F.; and that in Bombay the hot weather is least favourable for *brasiliensis* and the cold season least suitable for *astia*, whilst *cheopis* thrives at all times.

To this may be added some items from the author's observations of the life-history. Starved fleas of all three species fed quite readily on man. Males took feeds more frequently than females. *X. cheopis* fed on man

laid many eggs, but none hatched; no eggs were obtained from *X. astia* fed on man; a single *X. brasiliensis* fed regularly on man produced at least 31 eggs several weeks afterwards, some of which hatched. In the hot weather starved *cheopis* and *astia* might live for a week, but the majority died in 2 to 4 days. New-hatched fleas, however, might live unfed for 2 to 3 weeks at a temperature above 80° F., and a few such lived for 3 or 4 days in a dry incubator at 98.4° F. Fleas kept in a saturated atmosphere at 40° F. appeared dead after 24 hours, but quickly revived when transferred to room temperature and could be re-frozen and revived again for several successive days. It does not appear that the term of survival of the starved flea can be an important factor in determining the comparative efficacy of different species as plague transmitters (in Bombay). Eggs hatched in 2 to 9 days—the majority in 4 to 5 days. No eggs hatched in the dry incubator at 98.4° F., or in the damp refrigerator at 40° F. The duration of the active instars of larvae was much the same in all three species. With much individual variation cocoons often were formed on the 18th to 20th day. The duration of the quiescent cocoon stage ranged between 7 and 16 days—about 10 days in April. Cocoons of *cheopis* and *astia* have lived in the incubator at 98.4° F. for three days, but not longer, and a stay of 24 hours at that temperature or at 40° F. did not affect subsequent development at room temperature. The whole term of development from egg to adult has varied from 19 to 66 days, with no conspicuous difference between the three species. Among effective natural enemies of pupae of fleas are book-lice (Psocidae), of eggs and adults are ants, and of adults are spiders.

The authors' conclusions of Part IV support the view that "the chief factor in the spread of plague which is under the influence of climatic changes in Bombay is connected with the blocking phenomenon." Within a rather limited range of temperature and humidity a much larger proportion of infected fleas became capable of transmitting the infection. For the progress of plague a higher *astia*-index is required than in the case of *cheopis* or *brasiliensis*.

"The relative efficiency of the three species has been found to be closer at higher temperatures than under the conditions which appear more suitable for epidemic plague. An increased proportion of *astia* might therefore tend to limit or exclude the epidemic period with a given gross flea-index. The two factors, climatic conditions and flea species, are both, therefore, important variants. The contradictory views which regard one of these factors as of prime importance, the other being negligible, need no longer be considered irreconcilable. Further study of individual infected fleas which are proved capable of transmitting the infection is considered important. It is obvious that in the majority of infected fleas the plague bacillus has entered a blind alley."

The authors describe their procedure in, and tabulate and discuss the results of, the long series of experiments upon which these important conclusions are based. In summary: both sexes of all three species of *Xenopsylla* parasitic on rats are capable of harbouring the plague bacillus, but the proportion of infected fleas that become capable of transmitting the infection is not large and depends upon climatic conditions. Assuming that blocking is the most effective factor in the transmission of infection, it seems that climatic influences must largely determine the proportion of infected fleas that become blocked and are fated to increase the spread of plague. As a matter of fact, December and January and February are much the most favourable months for experimental plague-transmission with *cheopis* and *brasiliensis* in Bombay city, and these are the cooler and less arid months which in years past were notorious for a great increase in the number of human cases of plague reported in Bombay. *X. brasiliensis* as a transmitter is at

least as efficient as *cheopis*; *X. astia* is distinctly inferior to both, "not qualitatively but quantitatively. . . . Where it is almost the only rat-flea a high flea-index will be required if epizootic and epidemic plague is to continue." Although blocking has been observed in both sexes of *astia* and continuous transmission experiments have been successful with *astia* only, the authors have found male *astia* as of "low value" in transmission, and find that the proportion of infected *astia* that become capable transmitters of plague is much less than in the other two species. A summary hardly does justice to the large amount of careful and patient work reported in this paper.

A. A.

FAWCETT (Hugh A.). **Preliminary Rat-Flea Survey and Some Notes on its Relation to Local Plague, Hongkong.**—*Jl. Hygiene*. 1930. Nov. Vol. 30. No. 4. pp. 482-489.

This is a concise and careful paper and well worth reading in full. Incidentally it illustrates the worth of the old Horatian maxim:—

* "Quidquid praecipies, esto brevis, ut cito dicta
Percipiant animi dociles teneantque fideles:
Omne supervacuum pleno de pectore manat."

Hongkong is much infested with rats and mice; 155,572 were destroyed in the year 1928. Most of them are brought in killed or "found dead" and decomposed; very few indeed are fit for combing. From 442 live rats searched in the year 1929-30, 2,286 fleas were collected, 2,117 being *Xenopsylla cheopis* (not any *astia*), 163 *Leptopsylla musculi*, 3 *Ctenocephalus*, and 3 *Pulex*. The maximum number of fleas from a single rat was 67, all *cheopis*; other heavy individual *cheopis* infestations ranged from 20 to 57, three of the highest (39 to 57) being from rats caught in a rice-store. The maximum *cheopis* index (8.5) occurred in May; in June-August that index was over 7.0; in September, 5.2; in October and November, 3.5; in December-January, over 2.5; in February, 1.2; in March, 4.5; in April, over 5.0. It is pointed out that May, which has the highest *cheopis* index, has the highest rainfall and relative humidity of any month and a high mean temperature; and that February with a very much less rainfall and a lower relative humidity, and the lowest mean temperature of any month in the year, is also the month with the lowest *cheopis* index; and when these facts are compared with the human and rat plague statistics for the last ten years, it is seen that while far the largest number of cases of human-plague and rat-plague have fallen in May and the next largest in June, February is one of the months when human-plague is in marked retirement and rat-plague is dormant. April-July is the danger-season for Hongkong.

In the regional statistics of the city for the last decennium the districts showing the largest number of human cases of plague (319) and the highest *cheopis* index (6.6) include a densely peopled maritime area with narrow streets and some old houses, a large and constant sea-going

* Of which the following is an original and fairly accurate translation:—

Whate'er the preconceptions are—Be brief;
So lively words apprise the willing brain
And there hold fast in confident belief;
All surfeits from the sated bosom drain.

HORATI, *De Arte Poetica*.

trade carried in native craft, and a constant flux of floating population. It is at this floating insanitation in the midst of a busy coast-trade that the author points the warning finger for the renovation of plague (and other epidemics). The district where the figure for rat-plague is somewhat higher (24 as against 19) is also an area of narrow streets and many old tenements where a poor-class population has reached the quintessence of density; its *cheopis* index is high (5·8) and its figure for human plague is on the high side (156 as against 319); but it has not the particularly risky floating and coast-trade concentration. The measures that stand out in probable explanation of the comparative immunity from plague at present enjoyed by Hongkong are, house to house cleansing and whitewashing in all districts; removal of all superfluous woodwork and cavities in native houses; vigorous rat-killing.

A. A.

PATANÈ (Carmelo). La fauna murina di Bengasi ed i rispettivi pulicidi parassiti. Confronti col comportamento stagionale delle locali manifestazioni epidemiche di peste. [**Rats and their Fleas in Benghazi. A Comparison of their Seasonal Prevalence and Local Epidemics of Plague.**—*Arch. Ital. Sci. Med. Colon.* 1930. Sept. 1. Vol. 11. No. 9. pp. 544–566. English summary (9 lines). [Inst. of Colonial Path., Univ., Bologna.]

Of the 2,700 rats examined during 1920–23 56 per cent. are said to be *M. alexandrinus*, 44 per cent. *M. rattus*; but since a considerable proportion are entered as “classifiable with difficulty,” the figures are not of much value. The rat population is said to be higher in spring and summer. Of the associated fleas during two years—the average per rat being 3·5 in 1922, 4·2 in 1923—*Xenopsylla cheopis* and *Ctenopsylla musculi* constituted 97 per cent. of the total, the former slightly predominating; the residue were *Ceratophyllus fasciatus*, and *Ctenocephalus felis*, with an occasional *P. irritans* and *C. canis*. The returns of plague deaths for 6 years between 1914 and 1922 show the largest numbers in April–July; but except in 1917 and 1918 plague was not very prevalent, and in 1922 there were only 6 cases altogether, 34 in 1915, and 54 in 1921.

H. H. S.

HICKS (E. P.). The Early Stages of the Jigger, *Tunga penetrans*.—*Ann. Trop. Med. & Parasit.* 1930. Dec. 18. Vol. 24. No. 4. pp. 575–586. With 4 text figs. [16 refs.] [Sir Alfred Lewis Jones Research Lab., Freetown, Sierra Leone.]

After recounting some interesting historical facts in the dispersion of the adult jigger (*Tunga penetrans*) by shipping and by land and describing convenient methods of treatment and observation of its living larvae, the author gives an excellent and well-illustrated account of the larval anatomy, attention being directed to the following distinctive features: the existence of only two larval instars, the form of the egg-breaker, the form and number of mandibular teeth, the form of the maxillary palp, the processes of the labial palp, the four hooks on the ventral surface of the head, the form of the anal struts. The larva hatches on the 3rd–4th day, the first moult occurs on the 5th–8th day, preparation for pupation occurs on the 6th–17th day, the larva pupates on the 10th–18th day, the

imago emerges after the 17th day—in each stage dating from the laying of the egg.

A. A.

BUXTON (P. A.). **The Biology of a Blood-Sucking Bug, *Rhodnius prolixus*.**—Reprinted from *Trans. Entom. Soc. of London*. 1930. Dec. 31. Vol. 78. pp. 227–236. With 1 text fig. [8 refs.] [School of Hyg. & Trop. Med., London.]

The observations here recorded were made on a stock of *Rhodnius prolixus* that had been in captivity at least ten years.

The duration of the egg stage is "erratic," even of eggs laid by one female on the same day and kept at a constant temperature. It varies from 10 to 37 days, but the majority of eggs hatch between the 14th and 16th and between the 20th and 22nd days. There are five larval stages, the fifth and last moult occurring, in the author's experience, on the 99th day at a constant temperature of 24° C., and on the 72nd day at a constant temperature of 30° C. The larva generally feeds once in each instar; at its first feed it takes—in a few minutes—about twelve times its weight of blood, and even at the last stage about six times; the larval growth is "dramatic." The duration of *adult* life of three males was 156, 160, and 167 days, severally; of eight females 127, 133, 154, 169, 189 (twice), 203, and 207 days, severally. Fresh-emerged starved males (seven) lived between 30 and 60 days, and starved females (nine) between 30 and 40 days. Adults take relatively much less blood at a feed than larvae. The virgin female, if fed, lays eggs, which are barren. The male, however, even when deprived of his mouth-parts at his emergence, can produce fruitful spermatozoa. If female and male are cohabiting the first egg is laid on or about the thirteenth day of adult life. All the females observed by the author laid at least four batches of eggs; some laid more, but only one female produced as many as nine batches (URIBE is quoted as giving the total produce of a single female as 200–300). A single male could fertilize at least 7 females. Other interesting detail is recorded but is rather outside our scope.

A. A.

KATAGAI (Tatsuo). **Experimental Observations on the Life History and Bloodsucking Habits of *Rhodnius prolixus* from South America.**—*Taiwan Igakkai Zasshi (Jl. Med. Assoc. Formosa)*. 1930. Sept. No. 306. [In Japanese. With 18 figs. on 2 plates. English summary pp. 56–58.] [Govt. Research Inst., Formosa.]

The life of the captive bug *Rhodnius prolixus* is followed in overflowing detail. Breeding-season (in a Formosan laboratory) May–September. Number of oviposits by individual females during life ranged from 26 to 131, and total number of eggs laid by individuals ranged from 126 to 1,271. At room temperature incubation took from 11 to 16 days, and 59.46 per cent. of eggs hatched. Sucking blood at pleasure, larval existence ranged from 86 to 385 days, and adult life from 19 to 533 days. The insects were not dainty, and fed on nine kinds of domestic mammals, besides the monkey, rat, mouse, and the pigeon and hen; they could bear starvation withal, individuals in the third larval stage having fasted for 5 to 7 months.

A. A.

SAITO (J.). Ueber hautreizenden Giftstoff eines japanischen Giftschmetterlings, *Euproctis flava* Bremer. [**On the Skin-Irritant Toxin of the Japanese Noxious Moth *Euproctis flava* Bremer.**—*Japan. Jl. Dermat. & Urol.* 1930. Mar. Vol. 30. No. 3. pp. 230-243. With 2 text figs. [In Japanese. German summary pp. 29-30.] [Imperial Clinic for Dermat. & Syph., Univ., Sendai.]

Another contribution to the oft-discussed dermatitis caused by the nettle-hairs of the caterpillar of the moth *Euproctis flava*. Earlier writers thought that its causation was merely mechanical, but later writers demonstrated the presence of a toxic secretion. The present author confirms the existence of a toxin and describes its properties. [A good deal of general and particular information on this subject is to be found in papers summarized in this *Bulletin*, Vol. 19, pp. 843, 844; Vol. 20, pp. 472, 800; Vol. 21, p. 789; Vol. 22, pp. 913, 917; Vol. 23, pp. 295, 721; Vol. 24, pp. 400, 401, 894; Vol. 25, p. 287; Vol. 26, p. 277.]

A. A.

PAWLOWSKY (E. N.) & STEIN (A. K.). Experimentelle Untersuchung ueber die Wirkung des Bisses von *Periplaneta orientalis* auf die Menschenhaut. [**Effect of the Bite of *Periplaneta orientalis* on the Human Skin.**—*Arch. f. Dermat. u. Syph.* 1931. Vol. 162. No. 3. pp. 611-620. With 7 text figs. [16 refs.] [Military Med. Acad. & Inst. for Med. Science, Leningrad.]

This long story is illustrated by some very good and very familiar pictures of the individual mouth-parts and the salivary glands and reservoirs of the cockroach and of an enlarged vertical section of human skin through the excoriation of the epidermis caused by a cockroach.

A. A.

NUTTALL (H. F.). Le rôle pathogène des tiques. [**Ticks as Pathogenous Agents.**—*Bruxelles-Méd.* 1930. Oct. 12. Vol. 10. No. 50. pp. 1359-1366.

This is a masterly summary, critical and adequately historical, of existing knowledge of ticks in relation to disease, of the effects of their bite and the specific infections that they transmit, and of tick prophylaxis.

A. A.

RUTTLEDGE (W.). Notes on *Argas brumpti* (Acarina).—*Bull. Entom. Res.* 1930. Oct. Vol. 21. Pt. 3. p. 273. [2 refs.]

Close observers have failed to discover the host of the larva of *Argas brumpti*. One observer found that it would attach itself to the skinny head and neck of guineafowl. The present author cannot find it there in nature, but in the Nuba Mountains he found the larvae plentifully adherent to the loose skin of the head and neck of the very common lizard *Agama colororum*. This was in March; later in the year the lizards seemed free from tick larvae.

A. A.

DIOS (R. L.) & NOPOFF (R.). Les Ixodoïdés de la République argentine. [**Ticks of the Argentine Republic.**—*C.R. Soc. Biol.* 1931. Feb. 13. Vol. 106. No. 5. pp. 393-394.

A list of 13 well-known species and the hosts from which they were taken.

A. A.

DES ESSARTS (J. Quérangal). Parasitisme accidentel du tube digestif par un acarien de la famille des tyroglyphinés le *Tyroglyphus farinae*. [**Accidental Parasitism of the Intestine by a Tyroglyphine Mite, *Tyroglyphus farinae*.**—*Presse Méd.* 1930. Aug. 30. Vol. 38. No. 70. pp. 1176–1177.]

In the course of nearly 1,000 examinations of faeces at the Brest Marine Hospital laboratory during the past year flour-mites (*Tyroglyphus farinae*) were found in the stools in 8 cases. In 7 of these cases there was diarrhoea and in one case gastritis with hepatic complications. In four cases there was a past history of dysentery, but in only two of these were amoebae or cysts found. Of the other four cases no protozoa were found in three, *Lambliia* in one (along with *Trichocephalus* eggs), and *Trichocephalus* eggs in one of the others. The author thinks it unlikely that the flour-mite was the actual cause of the diarrhoea, etc., in these cases, but not improbable that it might have aggravated it. He states that imports of grain and flour are often infested with the mite, and that men handling the infested stuff sometimes suffer from oculo-nasal catarrh, respiratory affections, and itchy vesicular eruptions on the face, neck, and hands.

A. A.

ANDRÉ (Marc). Sur une larve d'acarien parasite de l'homme et des animaux en Uruguay, appartenant au genre *Trombicula* Berlese. [**A Trombicula Larva Parasite of Man and Animals in Uruguay.**—*Ann. Parasit. Humaine et Comparée.* 1930. July 1. Vol. 8. No. 3–4. pp. 355–361. With 3 text figs. [1 ref.]

TALICE (R. V.). Sur la trombidiose humaine en Uruguay. [**Trombidiosis in Man in Uruguay.**—*Ibid.* pp. 349–354. [13 refs.]

Both these papers relate to a new variety—*uruguayensis*—of *Trombicula irritans* Riley, the harvest-mite larva of Uruguay, which in that country, chiefly from December to March, is the cause of a distracting dermatitis similar to that caused in late summer in Europe by the larva of *Trombicula autumnalis*. André describes and figures the mite; Talice, while also noticing the mite, which he states is very similar to *Trombicula brumpti* Labille (1927), describes the well-known dermatitis.

A. A.

VAN THIEL (P. H.). *Trombicula flui* n. sp., a Patatta-Mite ("Patatta-Luis") of Surinam.—*Parasitology.* 1930. June. Vol. 22. No. 3. pp. 346–354. With 2 text figs. [13 refs.] [Inst. of Trop. Med., Univ., Leiden.]

The author comments on the *patata*-mite of Surinam named by LINNAEUS *Acarus batatas* and on the facts that two other S. American mites, namely *Trombicula helleri* Oudemans and *T. irritans* Riley (= *T. tlazahualt* Ewing) have been identified with the *patata*. He describes and figures as a new species, *T. flui*, caught on man in Surinam (and larva) in some cases containing blood) and therefore supposed by him, since it is different from *T. helleri*, either to be the *patata*-mite described by LINNAEUS or to signify that "*patata*-mite" is a collective term including two species *T. flui* and *T. helleri*. [The difficulty is not evaded so easily.]

A. A.

- i. VAN THIEL (P. H.). De "Patatta-luis" uit Suriname, met aantekeningen omtrent de aetiologie der Leishmaniosis americana. [**The "Patatta-Louse" of Surinam, with Notes on the Etiology of American Leishmaniosis.**]—*Geneesk. Tijdschr. v. Nederl.-Indië*. 1930. Jan. 1. Vol. 70. No. 1. pp. 47-63. With 2 text figs. [28 refs.] [Inst. for Trop. Med., Leyden.]
- ii. BONNE (C.). Opmerkingen over de Patatta-luis en de Leishmaniosis americana in Suriname. [**Remarks on the Patatta-Louse and American Leishmaniosis in Surinam.**]—*Ibid.* Feb. 1. Vol. 70. No. 2. pp. 176-179. [1 ref.]

i. "Patatta-louse" is an undefined species. The author here suggests directions for further research on this subject (information about the mago, seasonal occurrence, biology and ecology). He discusses the possible pathogenic significance of the mites; the itch and scratching caused by their bite may play an indirect part in the etiology of ulcers of the leg, but as regards specific diseases (American leishmaniasis, tropical typhus) they probably do not act as vectors.

ii. The author, who knows the Patatta-louse by experience as a very annoying insect in Surinam, agrees with VAN THIEL that it probably plays no part of any importance in epidemiology. As regards the American leishmaniasis, whatever the vector may be, he thinks that it does not transmit the virus direct from the patient; the sporadic spreading of forest yaws suggests the presence of a virus reservoir outside the human body.

W. J. Bais.

- BRUG (S. L.) & HAGA (J.). **Notes on the Sarcoptes found in a Case of Scabies crustosa and in a Case of Scabies in a Monkey.**—*Meded. Dienst d. Volksgezondheid in Nederl.-Indië*. 1930. Vol. 19. Pt. 2. pp. 221-226. With 1 plate. [10 refs.]

The Sarcoptes from the monkey (whose owner had been treated for itch) are here pronounced to be identical with the Sarcoptes from a case of Norwegian itch in a Chinaman. The authors are inclined to agree with those who doubt the validity of the different "varieties" of *S. scabiei*.

A. A.

- MIYAJIMA (M.). **Twenty-five Years of Parasitology in Japan.**—*Japan Med. World*. 1930. Feb. 15. Vol. 10. No. 2. pp. 32-35. [1 ref.]

——. Vingt-cinq années de parasitologie au Japon.—*Bull. Soc. Path. Exot.* 1930. July 9. Vol. 23. No. 7. pp. 685-691. [1 ref.]

A review of Japanese contributions to parasitology. In 1904 FUJINAMA and KATSURADA discovered *Schistosoma japonicum*; later KATSURADA observed that cats and dogs could be infected with the parasite by immersion in ponds reputed to spread the disease; and in 1913 MIYAIRI and SUZUKI discovered the intermediary pondsnail host and demonstrated the direct passage of the cercaria through the skin of the vertebrate host. In 1905 *Sparganum prolifer* was discovered by KATSURADA. In 1910 KOBAYASHI discovered the second intermediary host of *Clonorchis sinensis* to be a cyprinoid fish, and in 1919 the first intermediary host was found by MUTO to be a pondsnail. In 1915 NAKAGAWA showed that river-crabs and crayfish carried the encysted cercariae of *Paragonimus westermani*; and in 1920 this same

observer had followed out the life-history of *Fasciolopsis buskii* [showing it to be exactly parallel with that of *Fasciola hepatica* as described by THOMAS in 1883]. More recently OKUMURA followed the oncosphere of *Dibothriocephalus mansoni* into a species of Cyclops wherein [as in the case of *D. latus* described by ROSEN and JANICKI in 1917] it pursues its development. KOINO's corroboration of STEWART's discovery of the life-history of *Ascaris lumbricoides* [which had already received manifold confirmation] is also mentioned.

Outside helminthology appreciation is due, and is here given to the constancy and value of Japanese work on spirochaetes and on tsutsugamushi infection.

It is to IJIMA's *Jintai-Kiseidobutsu-Hen* (Animal Parasites of Man), published in 1888, seconded by GOTO's *Ectoparasitic Trematodes of Japan* (1894), that Dr. Miyajima attributes the inception of Parasitology in Japan, although he also keeps in pious remembrance the "Japanese physicians who lived a hundred years ago."

A. A.

ZAVATTARI (Edoardo). Note di parassitologia Cirenaica. [**Note on the Parasitology of Cyrenaica.**]—Reprinted from *Bol. Soc. Ital. di Med. ed Igiene Colon.* Supplement to *Giorn. di Clin. Med.* 1930. No. 13. 11 pp. [1 ref.] [Inst. of Comparative Anat. & Physiol., Univ., Pavia.]

The author spent August and September 1929 exploring Cyrenaica, where infection by *S. haematobium* and by *S. mansoni* had been recorded. He found *Planorbis numidicus* and *Pl. atticus*, but none infected; also *Bullinus contortus* in Derna and Atrun. Anopheles were very rare (an occasional *A. pseudopictus*) and malaria is absent. The true *Aedes argenteus* exists there without doubt: also *Culex pipiens*. Phlebotomus is very rare, Culicoides fairly numerous, Simulium (*S. equinum* and *S. latipes*) abundant in the Derna region. *Stomoxys calcitrans* and several species of Hippobosca were met with. *Ornithodoros savignyi* was very abundant in the Gialo oasis, but not elsewhere.

H. H. S.

ISORTI (Filippo). Considerazioni sui reperti degli esami di feci eseguiti dal 1 ottobre 1929 al 31 luglio 1930. [**Results of Faecal Examinations made between 1 October 1929 and 31 July 1930.**]—*Arch. Ital. Sci. Med. Colon.* 1930. Oct. 1. Vol. 11. No. 10. pp. 621-630. [20 refs.] English summary (4 lines). [Lab. of Colonial Path., Villa Torri, Bologna.]

During the ten months 608 specimens of faeces were examined at the Laboratory of Colonial Pathology, Bologna. 435 or 71 per cent. gave parasitic findings. *E. histolytica*, in cystic or vegetative form, was the commonest, being found 235 times (38.6 per cent.); *Lambli*a in 60 (9.8 per cent.); *Trichomonas* in 65 (10.7 per cent.); *E. coli* in 40 and *Chilomastix mesnili* in 22, the last nearly always associated with *E. histolytica*. *Blastocystis hominis* was found in 162 or 26.6 per cent. Helminthic parasites were not numerous; ova of *Trichuris* were found in 25, of *Ascaris* in 13, of *A. duodenale* 2, of *Sch. mansoni* 1, *Oxyuris*

vermicularis 2. The patients were inhabitants of the district and "had not been in contact with persons from the tropics."

H. H. S.

CURRAN (J. A.) & FENG (S. T.). **A Survey of Human Parasites of West Central Shansi with a Note on Diphtheria.**—*China Med. Jl.* 1930. Sept. Vol. 44. No. 9. pp. 891-904. [3 refs.]

Results of a study of intestinal Protozoa in stools of 1,135 Chinese in West Shansi; 236 were examined six times, 628 once, 28 five times, 31 four times, 70 three times, 142 two times. (In the series examined six times 37 per cent. of *Entamoeba histolytica* were detected in one examination and 76 per cent. by three examinations.) The infestation of the whole, in corrected percentage, is as follows: *Endolimax nana*, 35.6; *Ent. histolytica*, 15.0; "*Councilmania lafleuri*," 3.4; *Ent. coli*, 47.7; *Iodamoeba buetschlii*, 19.0; *Giardia intestinalis*, 9.2; *Chilomastix mesnili*, 15.7; *Trichomonas hominis*, 11.1. The percentage of *E. histolytica* increased gradually from 6.8 between one to fifteen years to 23.7 above fifty years of age; it was higher among patients having disorders of the alimentary canal than in other patients. Infestation with *Giardia* was only slightly higher in children. Except in the case of *Trichomonas*, infestation was lighter in summer.

Examinations of 1,015 patients for intestinal Helminths showed the following percentage: *Ascaris lumbricoides*, 55.3; *Trichuris trichiura*, 0.7; *Oxyuris vermicularis*, 0.2; *Hymenolepis nana*, 0.3. No hookworm was found. Ova of *Dicrocoelium dendriticum* were found, from 26 patients.

Kala azar is not common. Occasional cases of benign tertian malaria occur. In the course of 18 months all cultures from throats with membranous exudate have been negative for the diphtheria bacillus.

A. A.

FAUST (Ernest Carroll). **Animal Parasites of the Skin and its Adnexa.**—*Jl. Trop. Med. & Hyg.* 1931. Jan. 1. Vol. 34. No. 1. pp. 1-3. [Dept. of Trop. Med., Tulane Univ., New Orleans.]

This is an Address to the Louisiana Dermatological Society. Its sweep is unusually wide, since in addition to the well-known ectoparasites it includes "other invertebrates which produce lesions in the skin," also vertebrates—venomous snakes, amphibia, fishes, and even the duck-mole, *Ornithorynchus paradoxus*—and, at the other extreme, dermal infection by the dysentery amoeba.

A. A.

NICOLLE (Charles). Pourquoi les méthodes des laboratoires de microbiologie ne peuvent pas être unifiées. [**Why the Methods of Microbiology Laboratories cannot be made Uniform.**]—*Presse Méd.* 1930. Aug. 20. Vol. 38. No. 67. pp. 1131-1134.

This is a reflective paper; a not untimely argument on the influence of officialdom in science; a discourse, with appropriate illustrations,

on the dangers that impede and threaten to extinguish free thought in science by too much official dictation and bureaucratic ritual. The author begins by rejoicing in the freedom of the French spirit, which glories in new ideas rather than in that pluri-perfection of technical apparatus which some people nowadays call "progress." He has nothing to say against mechanical arrangements that economize time and money, simplify work, and further the communication of ideas ; but there must be no set limits to the range of inquisitive and creative thought. He is very warm on the subject of those central offices, conferences, and international congresses that demand from all Research Institutes universal conformity in the preparation of vaccines and serums, in laboratory usage and technique, and in the editing of publications ; such strict adherence to set standards should be limited to statistical statements. As three illustrations (of the many that could be given) of the real progress that issues from diversity rather than from stolid routine the author reviews the existing varieties of practice in the preparation of antivariolous and antirabic vaccines and antidiphtheritic serum. For laboratories where analysis, diagnosis, etc., are carried on for private profit, and where, perhaps, penury of ideas and service may wait upon penury of equipment, the author, of course, insists on official inspection and State control ; but in State Institutes the free intercourse and exchange of thought do not harmonize with a bureaucratic atmosphere.

A. A.

KALANDADSE (Wl.) & MTSCHEDLIDSE (I.). Materialien zur Biologie der *Gambusia affinis*. [**Biology of *Gambusia affinis*.**—*Nachrichten der tropischen Medizin*. Tiflis. 1930. May-June. Vol. 3. No. 1. pp. 23-40. [In Georgian script. German summary pp. 96-97.]

This is an account of the habits and behaviour of *Gambusia affinis*, a well-known bogy of the mosquito nursery, by observers in Tiflis, where it has been introduced recently ; it may interest those who are not familiar with a family of hardy and accommodative little fishes which has representatives in warm countries all round the globe (except Australia) and in all sorts of water—the Cyprinodontidae.

Gambusia affinis can thrive in what would seem to be very inauspicious circumstances—in dirty water, water choked with weed, water just deep enough to swim in—also in waterbutts, etc., but not in salt water or water containing iron-rust. Like many of its family it is viviparous, and a mother may produce 50 to 100 young at a birth. Although it can stand hunger for a long time it has an insatiable appetite. It swallows its own fry, at a rate, so the observers state, of seven in a minute, even when other good food is at hand. An adult, so they state, can devour 1,209 mosquito-larvae in the course of a day. Anopheles eggs are included in its fare, but not the egg-rafts of *Culex*. With all its prowess as a larvicide and pupicide, it cannot abide cold ; at temperatures below 50° F. it retires to the bottom and goes to sleep. Naturally it does not like petroleum and Paris green ; but petroleum is here stated to be not harmful if waterweed is present, and some individuals can survive even an introduction to Paris green, it is said.

A. A.

DERANIYAGALA (P. E. P.). **Some Probable Ceylon Larvivores.**—*Ceylon J. Sci.* (Sect. D. Med. Sci.). 1930. Nov. 7. Vol. 2. Pt. 4. pp. 191–201. With 3 plates.

This is intended "to assist officers engaged upon malaria control . . . to identify the commoner fishes of Ceylon which are likely to prove of value as destroyers of mosquito larvae." About twenty fresh and brackish water species are very briefly but very distinctively described under their scientific and vernacular names, and thirteen of them are figured *simplex munditiis* but with eloquent effect; furthermore, there is a short and sufficient glossary. Under such auspicious guidance the identification of the fishes will be labour of the kind that physics pain.

A. A.

KHALIL (M.). Introduction du poisson *Gambusia affinis* en Egypte, dans le Soudan anglo-égyptien, à Chypre et en Syrie pour combattre le paludisme. [**Introduction of *Gambusia affinis* into Egypt, Cyprus and Syria.**]—*Ann. Parasit. Humaine et Comparée*. 1930. Dec. 1. Vol. 8. No. 6. pp. 593–597. [Parasit. Dept., Faculty of Med., Cairo.]

This is a story of the introduction of the Cyprinodont fish *Gambusia affinis* into Egypt in 1926. Of these fishes, 394 were transported from a Corsican colony to Alexandria. Only 21 died in the course of transport, which occupied 3 weeks; the rest were railed at once to Cairo (4 dying on the journey), where 150 were distributed in fountains, waters of public gardens, and fish-ponds, and 131 in three larger ponds. After the lapse of about a year fishes were caught from time to time for stocking fresh localities. In the course of sixteen nettings made in fountains, etc., during the subsequent two years more than ten thousand of the progeny of these fishes were caught; but nothing has been seen, so far, of progeny of those liberated in two of the large ponds. *Gambusia affinis* may now be regarded as well established in Egypt; it has been distributed widely and in 1929 was placed at the disposal of the Public Health Department.

A. A.

BRASIL (Vital) & VELLARD (J.). Das Gift der brasilianischen Spinnen. [**Venom of Brazil Spiders.**]—*Seuchenbekämpfung*. Vienna. 1930. Vol. 7. Nos. 1, 2 & 3. pp. 12–22; 96–111; 158–176. With 18 text figs. [3 pages of refs.]

Accident from spider-bite is not uncommon in Brazil; in and about São Paulo in 3 years more than 60 cases were treated—some of them severe. This paper contains a brief account of nearly thirty of the more notorious Brazilian species of spiders, together with the authors' own observations of the nature and effects of their venom. It includes also a general history of the recorded lesions and injuries inflicted on man by spiders, together with a valuable bibliography containing 101 references, also an illustrated description of the venom apparatus of the spider and instructions for the removal of the venom glands and handling of venom. It therefore is more monographic in its outlook than

it appears in its title and should do much to stimulate and assist research in other countries.

Spider-venom is a colourless somewhat viscid fluid ; it dries at 37° C. as a light, yellow, hygroscopic powder soluble in distilled water and in saline ; its reaction is variable, according to the authors it is nearly always alkaline in warm or damp weather, and more often acid in cool weather. Its natural effects of course vary according to the species of the spider, but speaking generally the authors observe that in their experience it is not proteolytic, seldom (only in *Nephila*) coagulant, and not often—and then but slightly—haemolytic. Specific spider-venoms may be arranged in two groups according to their most pronounced effects. In one group come venoms that are neurotoxic like certain snake-venoms ; here the salient symptoms show excitation followed by paralysis of the nervous system ending (with small mammals) perhaps in convulsions and death. In the other group prominent effects are seen only at the site of the bite—local inflammatory oedema followed by dry necrosis of the skin. As one Brazilian example of a neurotoxic spider-venom take *Ctenus ferus*, of which the first effect is acute pain, followed by shivers and tremors and general tetany, convulsions and progressive paralysis ; also salivation, lacrimation, increased bronchial secretion, diarrhoea ; retention of urine, quickened breathing, tachycardia, arrhythmia ; in laboratory animals the venom is quickly eliminated if death does not follow within an hour. *Acanthoscurria sternalis*, the *Carangue jeira*, affords another example of a neurotoxic venom. Here heightened reflexes and blind uncoordinated movements are followed by tremors, rapid pulse, vomiting, increase of all secretions, diarrhoea, and polyuria ; then comes lethargy and either slow death or slow recovery ; and with these neurotoxic symptoms, there is great swelling and hyperaemia at the site of injection of venom. As a good example of a spider-venom that has almost no generalized effects the Brazilian *Lycosia raptoria* is conspicuous. Some hours after injection of the venom inflammatory swelling and vesiculation occur at the site, next day a zone of white dry necrosis of the affected skin is seen ; this spreads for 15 to 25 days leaving at last a large excavated ulcer, which may take 2 or 3 months in granulation ; the scar is like tortoiseshell and often painful.

In dealing with the venomous spiders of Brazil and their venoms the authors take the species each one in its zoological precedence, briefly describe them and their provenance, and then discuss the nature and effects of their venom as studied in the laboratory but occasionally as observed in hospital.

A. A.

BROWNING (W. H.). **Arachnidism—Spider Poisoning.**—*New Orleans Med. & Surg. Jl.* 1930. June. Vol. 82. No. 12. pp. 873–875.
*[3 refs.]

Report of a case in a man of 39 years, bitten on the glans when at stool, by a black spider. About 15 minutes afterwards he was taken with pain in the groins. About half an hour after that he was admitted to hospital cyanotic, writhing with pain radiating from the precordium to the left shoulder and arm, and in a profuse sweat. Nitroglycerin (1/100 grains) under the tongue gave considerable and quick relief. About four hours after admission his temperature was 101° F. and he complained of weakness and general aching ; but after a hypodermic injection of morphine he rested fairly comfortable. About 21 hours after being bitten his temperature was normal and he was discharged, feeling generally weak. At no time was there any local evidence of the bite. The spider was not identified, but since the paper is prefaced by an account of the symptoms following the bite of *Lathrodectes mactans*, by BOGEN (see this *Bulletin*,

Vol. 24, p. 401; see also Vol. 26, p. 278, TROISE), it would seem that this species was suspected.

A. A.

WALSH (Groesbeck). **Arachnidism: a Case of Poisoning from the Bite of *Latrodectus mactans*.**—*Southern Med. Jl.* 1930. Nov. Vol. 23. No. 11. p. 1038. [3 refs.] [Employees' Hosp., Tennessee Coal, Iron & Railroad Co., Fairfield, Ala.]

The patient in this case was a white man of 51 years, and the spider was properly identified as *Lathrodectus mactans*. The man was bitten in the right foot at 8 a.m. Twenty minutes afterwards he began to feel pain there—pain that gradually spread all along the right side until it reached the head and then became general. There was no difficulty of respiration. Admitted to hospital within four hours, he only cried aloud for something that either would stop the pain or would kill him outright. The abdomen then was distended and as stiff as a board, the peripheral tendon-reflexes were excitable, the skin was cold and clammy and the temperature subnormal (97° F.). Despite an early hypodermic of morphin and a subsequent dose of morphin (1/6 gr.) and atropin (1/200 gr.) in a solution of mag. sulph., mental disturbance and violent pain persisted until the evening and the abdominal rigidity into the night. The man did not recover his normal state until the following day when he was discharged complaining only of numbness and soreness of muscle.

The author has seen 13 cases of what has been believed to be bite from *Lathrodectus mactans*; all of the patients suffered extremely from generalized pain, and some like the present patient were half delirious, but the characteristic feature of them all has been "the intense board-like rigidity of the abdomen," closely resembling that seen after rupture of a viscus or perforation by a gastric ulcer.

A. A.

ESSEX (Hiram E.), MARKOWITZ (J.) & MANN (Frank C.). **The Physiologic Action of the Venom of the Honeybee (*Apis mellifera*).**—*Amer. Jl. Physiol.* 1930. July 1. Vol. 94. No. 1. pp. 209–214. With 7 figs. [3 refs.]

A study of the physiological effects of honeybee-venom (*Apis mellifera*). By intravenous injection into dogs and rabbits it induces a rapid fall of blood-pressure with decrease in volume of the kidney, increase in the volume of the hindleg and ultimately (in the dog) splanchnic dilatation and haemorrhage; and into guineapigs occlusive bronchospasm. Added to the perfusing fluid it rapidly incapacitates the isolated heart of the rabbit and causes maximum contraction of the isolated uterus of the virgin guineapig. Injected into the human skin it causes a reaction identical with that caused by (diluted) rattlesnake venom and by histamine. The venom is markedly haemolytic, haemolysis being preceded by a large increase in the volume of erythrocytes. Apart from the fact that failure of the heart is sometimes preceded by a short rise in blood-pressure, its physiological effect is similar to that of rattlesnake venom. Venom for experiment was obtained from lethargic winter bees. They were chloroformed *en masse*, the sting was thrust out by pinching the abdomen and then was seized and pulled clean out, with the venom-bag adhering, with a fine forceps. The venom-bag is then torn open with needles and its contents allowed to diffuse in a mixture of Ringer-Locke solution and glycerine, equal parts. Ten venom-bags to 1 cc. of the mixture is a convenient dilution.

A. A.

ÔTA (Masao). Etude expérimentale sur le venin de la punaise des lits. [**Experimental Study of Bed-Bug Venom.**].—*Japan. Jl. Dermat. & Urol.* 1930. Sept. Vol. 30. No. 9. pp. 966-976. With 1 text fig. [6 refs.] [In Japanese. French summary pp. 100-102.]

In 1919 in a paper on the venom of the bed-bug (*Cimex lectularius*) Ota expressed his disagreement with KLAUSNER (1916) who had affirmed the venom to be haemolytic. MIYAKE's (1922) observations are more in accord with Ota, who now repeats that an *aqueous* extract of bedbugs can kill small animals like mice and frogs, and in most men—although some persons are not susceptible—provokes urticaria and intense itching, and that it is not haemolytic to sheep, rabbit, rat, or man. For this aqueous extract 1 gm. of the insects is washed in ether and alcohol, then crushed and macerated in 5 cc. of normal saline and filtered. Its venomous properties are destroyed by heat at 100° C. for half an hour, but not at 56° C.

A. A.

VASSILIADIS (P.). La fonction antiparasitaire de la rate décélée par la splénectomie. [**The Antiparasite Function of the Spleen revealed by Splenectomy.**].—*Arch. Internat. de Méd. Expérim.* 1930. Sept. Vol. 6. No. 1. pp. 89-118. [40 refs.] [Bact. Lab., Univ., Louvain.]

The defence exercised by the spleen against certain parasites, the evidence for which comes to light only after the organ has been removed, may be shown (a) in restricting the numbers of the parasite, (b) in mollifying the character of the parasite, and (c) in occulting the parasite. Leaving aside here the production of antibodies, the restrictive effect on numbers may be observed when fieldmice or harvestmice having a "spontaneous" infection of the spirillum of Sodoku are subjected to splenectomy; after the operation the numbers of the spirillum are increased. The existence of a mollifying influence is apparent when an infection with *Trypanosoma lewisi* is communicated to a rat that has been desplenated; the altered rat suffers from sickness and anaemia, and may die—the normally harmless trypanosome becomes pathogenous. Again, *T. lewisi*, to which the harvestmouse is normally refractory, and *Eperythrozoon coccoides*, to which the rabbit is normally refractory, may become infective when those animals are desplenated. To illustrate the occultation of a parasite by the spleen the author gives at full length (twenty pages) the history of *Bartonella muris* and the pernicious anaemia of desplenated rats, and also of the innocuous *Eperythrozoon coccoides*; but as the substance of this story has recently been noticed at some length in this *Bulletin* (1929, Vol. 26, pp. 519-523) it need not be repeated.

A. A.

GAMBIA, Colony of the: ANNUAL MEDICAL AND SANITARY REPORT FOR THE YEAR 1929, p. 20.—IX. Scientific. **Notes by Dr. F. A. Innes, Medical Officer of Health.**

Of the three items of information one records that two 75,000-gallon fresh-water tanks in Gambia colony have been free from mosquito larvae for years, this being attributed to the presence in the water of

numbers of *Anisops*¹ *pellucea* larvae. Another item records the removal from a tumour (in the thigh of a native soldier) of *Onchocercus volvulus*²—a parasite not reported from Gambia before.

A. A.

BACIGALUPO (Juan). La *Limnaea viatrix* d'Orbigny, huésped intermediario de la *Fasciola hepática* L. en la República Argentina. (Nota previa.) [*Limnaea viatrix* Orbigny, the Intermediate Host of *Fasciola hepatica* in the Argentine.].—*Semana Méd.* 1930. Nov. 13. Vol. 37. No. 46 (1922). pp. 1481-1484. With 5 text figs. [1 ref.]

Infestation with *F. hepatica* is frequent in animals in the Argentine; in Buenos Aires sheep are mostly affected, in San Luis, Córdoba, La Rioja, Catamarca and Tucumán goats more particularly, but in the slaughter houses the parasites may be seen in the livers of cattle, pigs and goats and the geographical distribution of the parasitism is found to coincide exactly with that of *L. viatrix*. In June 1930 the author examined 20 specimens of *Limnaea* but found none infected naturally, though he was able to infect and obtain development in them experimentally. It is interesting to note that in human cases, he obtains positive intradermal reactions by using hydatid fluid and the complement deviation is also positive with hydatid antigen, while *vice versa* the two tests are not absolute with an antigen prepared from *F. hepatica*, since they are given also by patients with hydatid cysts.

H. H. S.

PALLARY (Paul). Résultats d'une prospection zoologique des eaux douces de la Syrie au point de vue médical. [*A Medico-Zoological Survey of Syrian Streams.*].—*Bull. Acad. Méd.* 1930. Mar. 11. Year 94. 3rd Ser. Vol. 103. No. 10. pp. 267-269.

The author examined districts of Syria from which schistosomiasis has been reported but was unable to find *Bullinus*, except at Saida, where *B. asiaticus* exists. He thinks that owing to the swiftness of the streams in Lebanon and Antilebanon there is little danger of schistosomiasis becoming established. He has not, however, been able to examine the left bank of the Euphrates. He found a *Limnaea* which acts as host for a liver fluke, and recommends its elimination.

A. G. B.

DALEAS (Pierre). Le haricot vert annamite contre les méfaits du mille-pattes. [*The Annam Bean for Centipede Lesions.*].—*Bull. Soc. Méd.-Chirurg. Indochine.* 1930. July. Vol. 8. No. 7. p. 742.

Short notices of two cases of painful blistering caused by a centipede, where the pain ceased in two or three hours and the vesication healed within 48 hours after application of a poultice of chewed and slobbered green beans. A referee, Dr. SALLET, states that the centipede is a *Geophilus* and the bean is the *Dau xanh*, or Mungo pea, *Phaseolus radiatus*, a richly farinaceous and much appreciated food, also used in Annamese medicine

¹ ὤψ is feminine and must have the adjective in the feminine.

² *Onchocercus* is said to be derived from ὄγκος and κέρκος (there being no Greek word "κέρκι"). κέρκος being feminine must have the adjective feminine in agreement.

as a diuretic and invigorant. He attributes the effect on the lesion mainly to the bean, although the Annamese think the saliva to be the better part, since they use the pure saliva (of the cock) for centipede wounds and make use of chewed grain and chewed leaves as topical applications for other poisoned wounds.

A. A.

MONTGOMERY (Hamilton). **Larva migrans (Creeping Eruption).**—*Arch. Dermat. & Syph.* 1930. Nov. Vol. 22. No. 5. pp. 813-821. With 3 figs. [19 refs.] [Mayo Clinic, Rochester, Minn.]

Description of a case of larva migrans identified by Prof. W. A. RILEY as *Gastrophilus*. The patient, an elderly farmer working in the field, felt a pricking (on flexor surface of right arm) that soon after became obvious as a small reddish papule. From this the usual tortuous line advanced, with itching, at the rate of 1.5 to 2 cm. daily. About the 12th day a small piece of skin containing the migrating larva was excised for identification. The larva lay in a burrow between the epidermis and cutis causing slight inflammatory reaction in both. The author describes the histology of the tunnel in detail and discusses the various organisms that figure as migrating larvae—the larvae of bot flies (*Oestrus*, *Gastrophilus* and *Hypoderma*), the nematodes of the genus *Gnathostoma*, the larvae of the hookworm *Ancylostoma brasiliense*—and he states emphatically that which one of them is present in any given case can be positively decided only by actual demonstration of the organism, not by the nature of the burrow. An instructive paper, well documented.

A. A.

GREIG (David M.). **Thanatophoric Fish.**—*Edinburgh Med. Jl.* 1930. Nov. Vol. 37. No. 11. pp. 638-640. [5 refs.]

The venomous fish of this paper is the well-known weever-fish (*Trachinus*) of European seas. A reported case of fatal paralysis "probably" due to its sting is criticized. References are given to W. N. PARKER's account (*P. Zool. Soc.* London, 1888, p. 359) of its poison apparatus, to DUNBAR-BRUNTON's account (*Lancet*, 1896, Vol. 2, p. 600) of its venom, and to other earlier authors.

A. A.

PORTER (Annie). **Certain Animal Parasites affecting Man in South Africa.**—*Jl. Med. Assoc. South Africa.* 1930. Aug. 23. Vol. 4. No. 16. pp. 471-474.

This is an instructive lecture taking a bird's-eye view of the subject but not containing anything new in the way of observation or experiment

A. A.

KOPSTEIN (F.). ***Rattus concolor otteni*, nomen novum.**—*Geneesk. Tijdschr. v. Nederl.-Indië.* 1931. Jan. 1. Vol. 71. No. 1. pp. 3-5. [Pasteur Inst., Bandoeng, Java.]

The author separates this subspecies (already known in plague literature as "harbour concolor") from *R. concolor ehippium* (the "mountain concolor" of plague literature) and *R. concolor equile*. It is to be distinguished from the other two subspecies principally by (1) its dark belly (hardly lighter

than the back), (2) its smaller size (body length without tail maximal 107 mm., against 130 mm. in *ephippium*). It has so far only been found in various ports on the north coast of Java.

W. J. Bais.

GEORGE (Ira D.). **Short Report of Work of the Snake Farm at Lancetilla, Tela, Honduras.**—*Eighteenth Ann. Rep. Med. Dept. United Fruit Company, Boston, Mass.* 1929. pp. 326-332. With 9 text figs.

CUDLIPP (J. S.). **Snake-Bite Cases in 1929, with General Comments.**—*Ibid.* pp. 332-351.

BROSIOUS (Otto Tiemann). **Boa Bite Case Report.**—*Ibid.* p. 352. [Chiriqui Land Co. Hosp., Puerto Armuelles, Panama.]

George says a few words about the snake "farm" at Lancetilla in Honduras, where the local reptiles are studied and the deadly snakes are made to render their venom to the serologist. Some of these snakes are figured, like as life. Cudlipp gives short abstracts of 39 cases of snake-bite treated, but they are not of much value since in 16 of them the snake was not identified, and in 9 of these there were no symptoms. Two cases, however, where the snake is said to have been a *terciopelo* (= *barba amarilla*, *Fer de Lance*, *Lachesis atrox*) were fatal. Of more value is the record of 104 cases of snake-bite (verified or alleged) treated in the course of three years—1927 to 1929—among a population of 150,000, chiefly agricultural labourers. Of these cases seven were fatal. In four of the fatal cases the snake was not identified; the salient symptoms mentioned are local painful swelling and discoloration, and bleeding from the mucosae; death followed (where the interval is known) 39 hours, 4 days, and 6 days after the accident. In one case the snake was said to be *Lachesis mutus* (bushmaster), and here too the prominent symptoms besides local painful swelling and discoloration, and vomiting of blood and bleeding from the nose, were pains in the abdomen, and bullous blistering of the swollen limb; death took place 24 hours after the accident. In the last two cases (1929) the snake was a *terciopelo* (*Lachesis atrox*), and in one of them the fatal result might possibly have been determined by the treatment received before admission to hospital; in the other the striking symptoms were great swelling of the bitten leg and copious spitting of blood, and death occurred 19 hours after the accident. In all the cases here reviewed the victim received proper modern treatment after admission to hospital. Brosious reports a case where the aggressor snake is said to have been a boa, but he gives no relevant particulars, except a figure of the fang-marks.

A. A.

KELLAWAY (C. H.). **Observations on the certainly Lethal Dose of the Venom of the Black Snake (*Pseudechis porphyriacus*) for the Common Laboratory Animals.**—*Med. Jl. Australia.* 1930. July 12. 17th Year. Vol. 2. No. 2. pp. 33-41. With 2 text figs. [7 refs.] [Walter & Eliza Hall Inst., Melbourne.]

This interesting research reminds us that MARTIN (*Proc. Roy. Soc. New South Wales*, 1895, Vol. xxix, p. 146) has given a very complete knowledge of the mode of action of the venom of the Australian Black Snake, *Pseudechis porphyriacus*. By intravenous injection in sufficient dosage this

venom is rapidly fatal by intravascular coagulation. It has too a haemolytic action (very notable in the dog) and attacks also the endothelium of the blood-vessels, causing haemorrhage into organs. When injected subcutaneously or into a vein, after destruction of the "thrombase" by heat, it displays a neurotoxic action in lessening reflex activity and notably in fatal paralysis of the respiratory centre. But if life be maintained by artificial respiration the additional action on the heart is shown, death shortly occurring by cardiac failure with a profound fall of blood-pressure that is only partly of vasomotor origin.

In the present study of the immunity response to this venom a number of exact experimental observations of its effects on the rabbit, guineapig, rat, and mouse are summarized as well as a few on the horse, monkey, and cat, and the results, which include notes of the symptoms and gross pathological findings, are recorded. The certainly lethal subcutaneous dose for most of these animals and the certainly lethal intravenous dose for the first four species has been determined. Comparison of the effects of this venom and of *P. guttatus* and of *P. australis* "shows that these venoms are closely similar in action, and that their certainly lethal doses for different species are all of the same order."

· A. A.

THOMSON (Donald F.). **Observations on the Venom of a Large Australian Snake, *Pseudechis australis* (Gray).** 1. **Synonymy.**—*Australian Jl. Experim. Biol. & Med. Sci.* 1930. Sept. 16. Vol. 7. No. 3. pp. 125–133. With 7 figs. (1 on a plate). [10 refs.]

KELLAWAY (C. H.) & THOMSON (Donald F.). **Observations on the Venom of a Large Australian Snake, *Pseudechis australis* (Gray).** 2. **The Venom Yields and Venom.**—*Ibid.* pp. 134–150. With 2 figs. (1 on a plate). [5 refs.] [Walter & Eliza Hall Inst., Melbourne.]

This is a very painstaking monograph of *Pseudechis australis*. The first part (Thomson) deals with synonymy and generic and specific characters; the second part (Kellaway & Thomson) with the biting apparatus and the effects of the venom as observed by subcutaneous and by intravenous injection into large numbers of animals of several species in graduated dosage. In summary, the venom is stated to be much less toxic than the venoms of *Notechis scutatus* (tiger snake), *Acanthophis antarcticus* (death adder), *Denisonia superba* (copperhead), *Oxyuranus maclelleni*, and *Diemema textilis* (brown snake), the toxia being of the same order as that of its congeners *P. porphyriacus* and *P. guttatus*. As with these two congeners, too, the venom is powerfully haemolytic, but it is unlike theirs in not possessing thrombase—it having a more powerful anticoagulant action than the venom of any other Australian snake yet studied. Evidence of neurotoxy was "conspicuously absent" in sheep, but early ptosis was observed in some monkeys, weakness and ataxia in rats and mice and incoordination in some rabbits, and some effect on the respiratory centres in some of the victims. The venom possibly contains a haemorrhagin. Unlike most Australian venoms, the venom has a striking action on the heart-muscle.

A. A.

KELLAWAY (C. H.). **Local Venesection in the Treatment of Snakebite of the Limbs.**—*Med. Jl. Australia.* 1930. Apr. 26. 17th Year. Vol. 1. No. 17. pp. 551–552. With 1 text fig. [1 ref.] [Walter & Eliza Hall Inst., Melbourne.]

A modified method of intermittent blood-letting—e.g. from the forearm in the case of a fingerbite from a deadly snake—with the aim of washing-out some of the venom, is described in detail. The idea is

intermittently to stop the venous return without at the same time staying the arterial flow. But, as the author allows, the whole promise of the method lies in starting it "during the first few minutes" after infliction of the bite; and, again, the effects of haemorrhage must not be superimposed on those of shock from venom.

A. A.

KELLAWAY (C. H.). **Local Venesection in the Treatment of Snake Bite: an Experimental Study.**—*Med. Jl. Australia.* 1930. Sept. 13. 17th Year. Vol. 2. No. 11. pp. 351–360. [13 refs.] [Walter & Eliza Hall Inst., Melbourne.]

This valuable experimental study will be appreciated by all who are interested in the fundamentally important subject of animal venoms. Sheep were used for experiment. A tense rubber tourniquet was applied above the carpal joint of the forelimb to arrest the arterial flow, and immediately distal a narrow cotton bandage to control the venous onflow, and the venom was then injected subcutim in the vicinity of the metacarpo-phalangeal joint. A superficial vein behind the carpal joint was now incised and, at five-minute intervals, during the course of about an hour the arterial ligature was removed for 1 to 1½ minutes to allow free bleeding from the venesection wound. In most of the experiments 280 to 400 cc. of blood was drawn, but even greater amounts could be taken from the larger animals without obvious hurt. To begin with the author reviews some carefully recorded experiments to determine the utility of simple ligature without any other treatment, some of them showing that in the case of a coagulant venom a very prompt and effective ligature is sufficient to save an animal's life. And, of course, the author insists that for delaying the passage of venom into the circulation and thus extending the precious time for other action, effective ligation "must remain the first and most important step in the treatment of snake-bite."

The object of the present experiments being to determine the utility of ligation followed by local venesection, the first step in the investigation was to ascertain whether the blood so drawn really contained any sensible quantity of venom; various experiments settled this question in the affirmative. Experiments were next undertaken to determine the utility of this mode of treatment after the injection of the venom of the Death Adder (*Acanthophis*), of the Tiger snake (*Notechis scutatus*), of the Copperhead (*Denisonia superba*) and of the Brown snake (*Diemenia textilis*).

Seven sheep received from 3 to 1½ lethal doses of Death Adder venom and were bled locally to the extent of from 100 to 400 cc.; five died in 17 hours to about 4 days; of 2 that had received 1½ lethal doses and had been bled to the extent of 350 to 310 cc., one survived without symptoms, the other recovered on the fourth day, after suffering from slight ataxia. Four sheep received from 1½ to 1½ lethal doses of Tiger snake venom and were bled to the extent of 390 to 280 cc.; two recovered on the 7th to 13th days, after suffering from weakness and paralysis; one survived without symptoms; one was killed, after recovery and relapse. Four sheep received from 1½ to 1 lethal dose of Copperhead venom and were bled up to 240 to 350 cc.; one died in 24 hours; the other 3 were paralysed at first and one died on the 13th day, but the other 2 recovered by the 12th day or after. Five sheep received from 0.03 to 0.02 mgm. per kilogram. of *Diemenia textilis* venom and were bled to the amount of 140 to 360 cc.; one died from thrombosis in 22 minutes, and another died on the

6th day ; 2 survived without symptoms (one had to be destroyed owing to a damaged limb) ; the probably lethal subcutaneous dose of this venom is something less than 0.02 mgm. per kilogram.

All the author's work is described in admirable detail, which, however, cannot be summarized to any useful purpose. The results of the experiments upon sheep show that local venesection controlled by ligature, if the treatment can be applied immediately, may in favouring circumstances save life in cases of bites by Death Adder and Tiger snake ; but in the case of Copperhead and Diemenia venom the prospects are not so promising. For, as the author allows, "the obvious difficulty in applying this treatment is the practical one that snake bites seldom occur when a doctor is at hand."

A. A.

REDDINGIUS (T.). Een geval van slangenbeet (*Ancistrodon rhodostoma*). [**A Case of Snake Bite** (*Ancistrodon rhodostoma*).]—*Geneesk. Tijdschr. v. Nederl.-Indië*. 1931. Jan. 1. Vol. 71. No. 1. pp. 30-34. [Med. High School, Batavia.]

A European of 46 was bitten a little above the ankle. The local symptoms were swelling and subcutaneous haemorrhage extending to and over the knee. The general symptoms were very slight and short collapse. Recovery followed, for which the author is inclined to give little credit to the treatment (excision of the wound, temporary constriction of the leg, antivenomous serum).

W. J. Bais.

OWTSCHARENKO (E. P.). Pathologisch-anatomische Veränderungen des Zentralnervensystems bei Vergiftung mit Kobragift. [**Pathological Changes of the Central Nervous System in Poisoning by Cobra-Venom.**]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1930. Dec. Vol. 34. No. 12. pp. 657-661. With 1 text fig. [8 refs.]

After a slender introduction to the Indian cobra and its venom the histopathology of the brain of cobra-poisoned mice is described in detail [slow poisoning—death in 4 to 6 hours]. From his observations the author concludes that cobra toxin causes paralysis of the vasomotors followed by local stasis and subsequent corresponding necrosis.

A. A.

ARTHUS (Maurice). Les anavenins (premier mémoire). Destruction de la toxicité des venins par le formol. [**Preliminary Memoir on Anavenins. Detoxification of Venoms by Formol.**]—*Jl. Physiol. et Path. Gén.* 1930. Vol. 28. No. 3. pp. 529-543. [1 ref.]

In his prologue the author refers to G. RAMON's discovery of anatoxins (*Ann. Inst. Pasteur*, Jan. 1925, Vol. 39, p. 1). RAMON gave the name "anatoxin" to bacterial toxins that have been rendered non-toxic by an addendum of formic aldehyde (formalin). The innocuous anatoxin imparts or engenders immunity against the toxin. RAMON also showed that by addition of formalin cobra-venom also became transformed into an inoffensive anatoxin with a specific immunizing property. He stated that a solution of 50 cgm. of dry cobra venom

in 200 cc. of saline—a solution of which 0.5 cc. subcutim would kill an 1,800 gm. rabbit in 5 hours—was quite harmless to rabbits in a subcutim dose of 100 cc. after admixture and subsequent incubation for a month with 0.4 to 0.5 cc. of formalin solution. Moreover, rabbits that received at 4 or 5 days' intervals increasing subcutim doses of 5, 10, 12, 15 cc. of the formalinized venom (anavenin) thereby were made refractory to 50 mgm. (40 mortal doses) of the pure venom. The author also quotes Mme. HEYMANS (*Arch. Intern. de Pharm. et de Therap.*, 1926, Vol. 32, p. 101) on the attenuation and protective utility of cobra anatoxin.

The present paper is a long and interesting symphony on this theme ; in consonance and plentiful harmony, and with movements bringing *Naja bungarus* (King Cobra), *Naja flava*, *Naja haje*, *Vipera russellii*, *Vipera aspis*, *Lachesis lanceolatus* (Fer de Lance), *Crotalus terrificus* and *Crotalus adamanteus*—Europe, Africa, Asia, and America—all in concord on this subject of formalinized snake-venoms or anavenins.

A. A.

ARTHUS. Pour mieux connaître les anatoxines. [**For Better Understanding of the Anatoxins.**]*—Bruxelles-Méd.* 1930. Nov. 2. Vol. 11. No. 1. pp. 1-13.

For better understanding of the anatoxins we are here invited to study the snake anavenins. We begin with RAMON's discovery that formol translates bacterial toxins into harmless immunizing anatoxins, and in particular with his discovery that under the prolonged action of formol at a temperature of 38° cobravenom is deprived of its toxic powers though not of its immunizing properties. Mme. HEYMANS corroborated this discovery, with the reservation that the toxicity was diminished, not *completely* suppressed, and the immunizing properties weakened by formol. The present author also, who has experimented with venoms of Naia, Bungarus, Viper, Lachesis and Crotalus, has confirmed the discovery ; he states that this neutralizing action of formol is easy to demonstrate, and also that he has immunized laboratory animals with formolized venoms of several species of thanatophidia against mortal doses of the severally corresponding venoms. Since, then, the specific formolized venoms are both specifically antitoxic and antigenic, why not call them " anavenins " in analogy with anatoxins ? The author is at this point confusing, and we are left not quite certain whether cobra-anavenin, which furnishes so much of the subsequent discourse, is entirely detoxified, or whether it retains 1/200 part of the toxic power of the original venom—until the end of the paper is reached.

The main object of the paper seems to be to explain that formolized venoms or anavenins besides being non-toxic and immunizing, are also, like venoms, in certain circumstances anaphylactic and capable of inducing a proteotoxic or anaphylactic shock in animals already sensitized by anavenins. This anaphylactic shock is exhibited, for instance, when an animal (rabbit) having been sensitized by cobra anavenin (or by non-mortal doses of cobra venom) receives some time afterwards an intravenim dose of cobra venom. Death occurs prematurely, and is preceded not by the usual symptoms of cobra-poisoning but by a sudden fall of blood-pressure and by quickened respiratory rhythm and other symptoms which the author regards as due to serum-toxins and not to specific toxins of the venom. The author's final

statement is that formol entirely suppresses the toxicity of venoms. He adds that since the immunization of rabbits by injection of anavenins induces a state of anaphylaxis and the injection of anavenin into an already sensitized rabbit may precipitate an anaphylactic shock, it is not necessary therefore to conclude that immunization of children by diphtheria anatoxin must be renounced.

A. A.

VEILARD (J.) & PENTEADO (Jarbas). Action des rayons ultraviolets sur les venins. [**Effects of Ultraviolet Rays upon Venoms.**]*—C.R. Acad. Sci.* 1930. Sept. 15. Vol. 191. No. 11. pp. 458-460.

A study of the effects of ultraviolet irradiation upon the venoms of the snakes *Lachesis atrox* and *jararaca*, *Crotalus terrificus*, and *Naja tripudians*, and the toad *Bufo marinus*. Solutions of the venom were exposed in glass plates to irradiation from a quartz lamp, at 25 cm., for 2 up to 45 minutes. As the result of evaporation the solutions became viscid (excepting *L. atrox*), their colour changed, and (excepting *Lachesis*) opalescence and precipitation took place. The acidity of the solutions increased; the toxin of the toad was but slightly affected, but with snake-venom there was attenuation of the globulins increasing with length of exposure; the precipitates were always inactive. With large doses of venom irradiated for 45 minutes, the authors, contrary to the experience of ARTHUS and FAVRE, were able to protect and to immunize guineapigs and goats.

A. A.

- i. VELLARD (J.) & VIANNA (Miguelote). Technique pour la réaction de fixation du complément avec les sérums anti-ophidiqes. [**Technique for the Complement-Fixation Reaction with Antophidic Sera.**]*—C.R. Soc. Biol.* 1930. Oct. 16. Vol. 105. No. 27. pp. 101-103.
- ii. ——— & ———. Spécificité de la réaction de fixation du complément avec des sérums monovalents anti-*Lachesis*. [**Specificity of the Complement-Fixation Reaction with Univalent Anti-Lachesis Serum.**]*—Ibid.* pp. 103-105. [Bios Inst., Nictheroy, Brazil.]

i. In this preliminary paper are described various technical methods for the fixation of the complement with antophidic sera, especially for determining the specificity of the fixation. The test cannot be summarized.

ii. Studying particularly the complement-fixation reactions of univalent anti-*Lachesis* sera with their corresponding venoms the authors find that these antibodies, like the other antibodies (antitoxic, anticoagulant, etc.) of the sera are in a high degree specific. They fix their corresponding venom energetically. Venoms of other species may also be fixed, but in some minor degree corresponding with their zoological affinity with the species that furnished the venom from which the antiserum was prepared.

A. A.

OTTO (R.). Zur Wirkung der Schlangengiftantisera auf die Gifte europäischer Ottern. [**Action of Snake Antisera on the Venom of European Vipers.**]*—Ztschr. f. Hyg. u. Infektionskr.* 1930. Oct. 13. Vol. 111. No. 4. pp. 503-510. [1 ref.] [Robert Koch Inst., Berlin.]

Some experiments showing that mice by body-weight are considerably more tolerant of certain viper-venoms than guineapigs.

A. A.

BRAZIL (Vital), Jr. Ueber Komplementbindungsversuche mit Schlangengift-Immunseris. [Complement-Fixation Experiments with Sera Immunized to Snake-Venoms.]—*Ztschr. f. Immunitätsf. u. Experim. Therap.* 1930. Vol. 69. No. 1/2. pp. 126-133. [6 refs.] [Vital Brazil Inst., Nictheroy, Brazil.]

Pure serological experiment with sera immunized to venoms of certain North American snakes : not amenable to summary.

A. A.

HARA (Y.). Experimental Studies on the Poisons of Formosan Snakes. (II. Report.) The Influence of the Snake Poisons on the Resistance of the Red Blood Corpuscles, on the Velocity of Sedimentation of the Red Blood Corpuscles and on the Blood Coagulability.—*Taiwan Igakkai Zasshi (Jl. Med. Assoc. Formosa)*. 1930. Sept. No. 306. [In Japanese. English summary pp. 50-51.] [Govt. Hosp., Karenko, Formosa.]

This is the author's abstract of a purely academic exercise. Several kinds of desiccated venoms seem to have been studied, but the names of only two of them—*Lachesis gramineus* and *Ancistrodon acutus*—are mentioned.

A. A.

CAWSTON (F. G.). Acute Poisoning from Bee Sting, Recovery.—*Jl. Trop. Med. & Hyg.* 1930. Dec. 15. Vol. 33. No. 24. p. 391.

CESARANO (Umberto) & GIORDANO (Mario). Myiasi uretrale causata da larve di una *Anthomyia* (*Fannia canicularis*). (Nota preventiva).—*Arch. Ital. Sci. Med. Colon.* 1930. Aug. 1. Vol. 11. No. 8. pp. 459-463. With 4 text figs. (2 coloured). English summary (5 lines) p. 463. [Lab. of Colonial Path., Villa Torri, Bologna.]

EVANS (A. M.). On Certain Distinguishing Characters observed in *Anopheles funestus* Giles.—*Ann. Trop. Med. & Parasit.* 1930. Dec. 18. Vol. 24. No. 4. pp. 587-592. With 2 text figs. [6 refs.] [School of Trop. Med., Liverpool.]

GREENWAY (D.) & CROCE (C.). Myiasis intestinal humana.—*Arch. Argentinos Enferm. Aparato Digest. y Nutric.* Buenos Aires. 1930. Oct.-Nov. Vol. 6. No. 1. pp. 35-46. With 6 text figs.

KOIDZUMI (Makoto) & HAKUSHI (Rigaku). The Anophelines of Formosa.—*Riv. di Malariologia.* 1930. May-June. Vol. 9. No. 3. pp. 232-235.

LOTZE (Harald). Die künstliche Proteosomainfektion der Vögel. Ein Beitrag zur Frage der Immunität und Immunisierung bei Vogelmalaria. I. Mitteilung.—*Zent. f. Bakt.* I. Abt. Orig. 1930. Dec. 22. Vol. 119. No. 3/4. pp. 165-171. [44 refs.] [Hyg. Inst., Univ., Greifswald.]

ODRIOSOLA (Ricardo). Ein Beitrag zum Studium der Protozoenerkrankung des Darmes beim Kinde.—*Arch. f. Schiffs- u. Trop.-Hyg.* 1930. Dec. Vol. 34. No. 12. pp. 643-651.

PAVLOVSKY (E. N.). *Ornithodoros papillipes* Birula and *O. cholodkovskiy* n. sp.—*Parasitology.* 1930. June. Vol. 22. No. 3. pp. 355-360. With 17 text figs. & 1 plate. [2 refs.]

DE ROOK (H.) & SOESILO (R.). *Anopheles (Bironella) Papuae*.—*Meded. Dienst d. Volksgezondheid in Nederl. Indië.* 1930. Vol. 19. Pt. 2. pp. 213-218. With 6 text figs.

- SHANNON (Raymond C.) & JUNIOR (José Seraphim). Revisão do catalogo da fauna de anophelinos no Brasil. Com observações sobre algumas especies do grupo nyssorhynchus encontradas na Bahia e Recife, consideradas de importancia como os mais provaveis vehiculadores de malaria nessa região. Revision of the Classification of Brazilian Anophelines, including Observations on some Species of the Nyssorhynchus Group found in Bahia and Recife and considered to be the most Important Malaria Vectors in this Region.—*Archivos de Hyg.* Rio de Janeiro. 1930. May. Vol. 4. No. 2. pp. 79-96. English summary.
- SINTON (J. A.). The Female of *Phlebotomus nicnic* Banks.—*Indian Jl. Med. Res.* 1930. July. Vol. 18. No. 1. pp. 165-169. With 10 figs. on 1 plate. [4 refs.]
- SINTON (J. A.). Notes on Some Indian Species of the Genus *Phlebotomus*. Part xxv. *Phlebotomus maynei* n. sp.—*Indian Jl. Med. Res.* 1930. July. Vol. 18. No. 1. pp. 195-198. With 10 figs. on 1 plate. [6 refs.]

LABORATORY REPORTS.

NIGERIA. Annual Report of the Medical Research Institute, 1929
[CONNAL (Andrew), Director].—*Ann. Med. & San. Rep. Nigeria, 1929.* Appendix A. pp. 1-30. With 3 folding charts. [3 refs.]

Of 75,853 rats examined for plague, 71,027 being *Rattus rattus*, 430 were found infected, all but 5 of them being *rattus*. Of their fleas 4,864 were *X. cheopis* and 1,681 were *X. brasiliensis*, the remaining 6 being equally dog-flea and chigger. The usual signs of plague in the rat are described seriatim and the statistics of buboes recorded. Among noteworthy pathological investigations are (a) of three common types—eczematoid, vesicular or bullous, and ulcerative—of streptococcal dermatitis; the first may show crusts resembling impetigo, and the second may be mistaken in its early stage for scabies; (b) Ducrey infection (bacillus of soft sore) which, short of bacterial and histological examination, may be mistaken for granuloma inguinale; (c) cases of facial tuberculosis, in a yaws area, that do not respond to N.A.B. treatment, but have as a salient histological feature a preponderance of giant cells; in two cases acid-fast bacilli (intracellular) were seen, and inoculations from these into *rhesus* monkeys and from them to guineapigs gave ample corroboration of the bacillus; (d) cases of a disease simulating leprosy, the edges of the lesions infiltrated with giant cells, but no acid-fast bacilli visible; (e) intranuclear changes in the liver-cells in yellow fever—a fragmentation or excess of chromatin (staining dark blue with Giemsa) and the presence of abnormal granular, acidophil, material—apparently specific; (f) identification of Negri bodies in the brain of dogs from five stations in S. Nigeria; (g) a careful record of histological observations of the tissues in post-mortem material from a case of blackwater fever; (h) a long instalment of an investigation of the causes of the diarrhoeas and dysenteries of Lagos, which states that there is a steady flow of cases of dysentery in which neither *E. histolytica* nor *Bact. dysenteriae* can be detected; the organisms so far identified are *Bact. dys. Flexner* (34 cases), *Bact. dys. Schmitz* (2 cases) and *Bact. Morgani* (8 cases); but no cases of Shiga dysentery so far, although this organism has been isolated here in recent years; the Flexner bacillus occurs in "various types . . . some agglutinating strongly and some poorly with type sera," and "there is reason to believe that the poorly agglutinating strains form a type of their own." Abstracts are given of ten case-reports of blackwater fever, 7 British, the others Greek, Syrian, and native African; one in a female; ages ranging from 20 to 43 years; a first attack in all except the Syrian and the African. Subtertian parasites were seen in 5 cases; five cases were fatal. Of neoplasms 76 specimens were received, mostly with good clinical notes; 42 of them (40 from Africans) were malignant, 23 being classed under carcinoma, 4 under endothelioma, and 15 (including 2 melanotic) under sarcoma. Attention is drawn to the great variety of malignant tumours in Africans; to their unusually high incidence in children and adolescents; to the high percentage of diffuse carcinoma; and to the large percentage of liver cancers and of the constant relation of these to cirrhotic changes in the liver. In Entomology besides a vast amount of routine and recording, larvicides have been tried in the field, feeding experiments have been carried on, and a search for naturally infected "wild" anophelines has been made. In this search *A. gambiae* has been found

infected four times with malaria parasites (twice oocysts, twice sporozoites) and eight times with filaria; and *A. pharoensis* once, with oocysts.

A. Alcock.

- i. NIGERIA. **Annual Report of the African Hospital Laboratory, Lagos, 1929** [MORRISON (H.), Pathologist].—*Ann. Med. & San. Rep. Nigeria, 1929*. Appendix C. pp. 51–61. With 2 charts.
- ii. —. **Annual Report on the Pathological Laboratory, Kaduna, 1929** [McCULLOCH (W. E.), Pathologist].—*Ibid.* Appendix D. pp. 63–76.
- iii. —. **Annual Report of the Pathological Laboratory, Calabar, 1929** [RAMSAY (G. W. St. C.), Pathologist].—*Ibid.* Appendix E. pp. 77–82.

i. In the routine work, in a total number of 1,172 slides of malaria-infected blood 2.5 per cent. were quartan and all the rest were subtertian. Trypanosomes were found in 3 films, and microfilaria in 32—sheathed in 21, unsheathed in 11. The reporter fully endorses his previous critical appreciation of the Kahn test; he never uses an antigen more than 2½ months old, and he thinks that titration should be done once every 3 weeks. In 1,769 African faeces 948 showed *Ascaris*, 719 hookworm, 648 whipworm, 4 *Schistosoma mansoni*, 15 *Taenia saginata*, 116 flagellates, and 23 cysts and 39 free forms of *Entamoeba histolytica*. Of 24 stools plated 5 showed Flexner Y, and 2 Shiga infection. Of 1,664 African urines 30 contained eggs of *Schistosoma haematobium*, 3 only being from women. Of 445 African sputa 53 were tuberculous. Seventeen malignant tumours were determined histologically—12 carcinoma, 3 sarcoma, and 2 lymphosarcoma. An interesting account is given of an obscure case of carcinoma of the pancreas in a European. Comment is made on the not uncommon occurrence of primary cancer of the liver in Nigeria, and also on the frequency of cirrhosis of the liver and its possible part as one of the precursors of malignancy. Post-mortem evidence shows respiratory disease in the first place, and tuberculosis of various forms in the second, among 128 deaths from natural causes. The characteristic heaviness of the infection and semi-acute course of the disease in the pulmonary tuberculosis of Africans is commented on. Among the batch of interesting post-mortem reports is a case of intestinal schistosomiasis; the patient had been admitted with diarrhoea and (in the routine examination) with eggs of *S. mansoni* in stool and *S. haematobium* in urine; 3 days later he suddenly collapsed with all the signs of internal haemorrhage, and died; at the autopsy the large intestine was distended with blood, its wall was considerably atrophied, and eggs of *Schistosoma* were found from caecum to anus, little remained of the muscosa and submucosa, the liver on section showed the typical picture of a multilobular cirrhosis. Three cases of sudden death are noticed, all children, where the only adequate cause was a very obvious enlargement of the thymus.

ii. In 396 malaria infections the only parasite found was the subtertian. *T. gambiense* was present in 3 films, *Filaria perstans* in 9, *F. loa* in 1. In 1,567 African faeces *Ascaris* occurred in 61, hookworm in 222, whipworm in 27, *Schistosoma mansoni* in 19, *Taenia saginata* in 45, and *Entamoeba histolytica* cysts in 284 and active forms in 50.

In 1,081 urines the only noteworthy events are the finding of active *Entamoeba histolytica* in two European and two African cases, in all of which the beneficial results of injections of ematine were "dramatic." The tubercle bacillus was present in 17 of 167 specimens of African sputa. Of malignant tumours 15 were determined histologically—adenoma 2, carcinoma 4, epithelioma 4, endothelioma 1, sarcoma 2, melanoma 2. Frequent occurrence of gumma of the testicle is noticed.

Special attention to the subject has shown the Kahn test, now that the antigen is retitrated every month, to be more specifically sensitive than the Sachs-Georgi. Special investigation of pondsnails for cercariae was made; 3 species were found and among them, in a Planorbis, a dicurcous apharyngous form presumed to be *Schistosoma haematobium*. Other subjects that received attention are milk of an indigenous cow (no tubercle or coli bacilli), sodawater (no coli, but a heavy crop of *Closterium spermoides*), and native drugs (apparently based on sympathetic magic), also nematode worms and snakes, and animal metabolism (cattle experiments).

iii. In 1,318 blood examinations the subtertian parasite occurred in 173, the quartan in 20, the benign tertian in 1, *Filaria perstans* in 282, *F. loa* in 38, *F. bancrofti* in 2. In 1,344 faeces Ascaris occurred in 1,019, hookworm in 688, whipworm in 469, Strongyloides in 62, tapeworm in 1, *Entamoeba histolytica* in 17, *Balantidium coli* in 1 (a child of 13 years, the first case observed by the reporter in Calabar in the course of six years). No malignant tumours came to light. Among the post-mortem records is one of a child about 18 months old that died in convulsions, without affording evidence of any sufficient cause of death except complete obstruction of the bowel in several places by knotted masses of dead ascarids. In another case the death of an anaemic and emaciated youth might (it is thought) be attributable in the ultimate resort to the activities of 43 ascaris living in the intestine. In a case of rabies Negri bodies were found in the basal ganglion cells of the brain.

A. A.

BOURGUIGNON (G. C.). Rapport sur les debuts du fonctionnement du laboratoire de bacteriologie de Coquilhatville, année 1929. [**The Début of the Bacteriology Laboratory of Coquilhatville, 1929.**]—*Ann. Soc. Belge de Méd. Trop.* 1930. Sept. 30. Vol. 10. No. 3. pp. 341–361. With 6 text figs.

The Coquilhatville laboratory, although not then "armé à point exactly, cap à pé," made its debut in 1929. In its action against trypanosomiasis 3,913 natives were inspected and 2,394 laboratory examinations (lymph-glands, blood, c.s. fluid) made. In the course of four months 16 out of 59 natives and 3 of 8 Europeans examined were found to be tuberculous, but 59 native girls (2 to 12 years) were negative all to the tuberculin test. The malaria statistics—chiefly for the malaria season September–December—show, for 174 native girls (2 to 18 years) examined, 144 infected, viz., 134 malignant tertian, 7 quartan, and 3 both, mixed; for 205 prisoners, all but 30 infected, all malignant tertian; for 172 native hospital patients, 120 infected, 119 being malignant tertian, and 1 quartan; and in a population of 553 Europeans 37 cases of malaria in three months—35 malignant tertian and 2 quartan. Of 1,666 native adults' stools examined for

intestinal parasites 1,364 were positive—hookworm, ascaris, trichuris, strongyloides, oxyuris (1 case), *Schistosoma haematobium* and *S. mansoni*; *Trichomonas intestinalis*, *Entamoeba histolytica* (2 cases), *Balantidium coli*, and Tyroglyphus; in 175 examinations of native girls, 155 positive—all the above species of worms with the exception of *S. haematobium* and the addition of *Taenia saginata* being represented; and in the native jail in 38 examinations 30 were positive.

A. A.

ANNALES DE LA SOCIÉTÉ BELGE DE MÉDECINE TROPICALE. 1930. Sept. 30. Vol. 10. No. 3. pp. 231–273. With 7 text figs. [7 refs.] Rapport sur le fonctionnement du laboratoire de Léopoldville-Ouest et des services annexes pendant l'année 1929. [Leopoldville Laboratory Report for 1929.]

Research from the Leopoldville laboratory has been published in *Bull. Soc. Path. Exot.* and *Ann. Soc. Belge de Med. Trop.* for 1929. The items here extracted are from the record of routine work. Of trypanosomiasis among natives 464 cases have been treated during the year, the number of new cases being 199; in the search for infection 4,461 laboratory examinations (lymph-glands, blood, and c.s. fluid) of natives have been made. Tuberculosis continues to increase to a disquieting extent; 74 new cases have been detected in natives and 7 in Europeans. B.C.G. vaccination has been received by 137 newborns. Malignant tertian malaria was diagnosed in 989 natives and 72 Europeans, quartan in 55 and 5, mixed malignant and quartan in 4 natives; malaria statistics show gradual acquisition of resistance to malaria with increasing age in young blacks. In 126 examinations for leprosy 12 were positive. In 497 examinations of individual stools for intestinal parasites 285 were positive, the species being hookworm, ascaris, trichuris, strongyloides, schistosoma, *Entamoeba histolytica* and *E. coli*, trichomonas, and balantidium. The vaccines distributed during the year were antityphoid 57,400 cc.; antipneumococcus 34,250 cc.; antimeningococcus 25,440 cc.; antigenococcus 2,980 cc. For treatment of amoebic dysentery rivanol proved no better than yatren. 26 medical and hospital assistants took the course for certification.

A. A.

SOUTH AFRICAN INSTITUTE FOR MEDICAL RESEARCH. **Annual Report for the Year ended 31st December, 1929** [LISTER (Spencer), Director].—84 pp. With 1 chart & 2 plates. 1930. Johannesburg.

The Research section of this report begins with plague. The organism isolated last year from the plague-like epizootic among Namaqua gerbilles (De Aar Disease) has been examined and provisionally named *Pasteurella desmodilli*; it has been isolated again from another outbreak among gerbilles, this year. Recent experiments have brought *Xenopsylla hirsuta* of the Lobengula gerbille into the list of potential plague-transmitters, and have shown that local fleas can transmit the disease from rodent to rodent. The pollens of grasses and of Compositae continue to be implicated in Hay Fever, and in connection with this troublesome malady attention is drawn to a paper by BALYEAT (*Jl. Lab. & Clin. Med.*, 1927–28, Vol. 13, p. 516) on the

lurking danger of the ubiquitous orris-root powder. Search for a rapidly diagnostic skin reaction for Ancylostomiasis has been "not too encouraging." The use of cyanide sand for destroying hookworm larvae in the soil is not without promise. Hookworm larvae are stated to have survived in the laboratory in soil and in water cultures for 2 years, and eggs and larvae ingested by cockroaches have been passed alive. Since the local strains of pneumococcus are constantly changing—being replaced by "aberrant" strains—this involves the constant typing of pneumococci isolated from all referred cases of pneumococcal infection, for the preparation of suitable prophylactic and therapeutic vaccines. For similar reasons the meningococci recovered from spinal fluid in cases of cerebrospinal fever are submitted to the absorption test for grouping. Particulars and classification of the organisms thus recovered from the lungs and cerebrospinal fluid are given. Search for a filterable virus in morbid material from pneumonia cases so far has not been successful. A rare case of pneumonia, due to the Friedlander bacillus and having dark-red viscid sputum, is described. Research in tuberculosis in connexion with the Tuberculosis and the Miners' Phthisis Prevention Committees is not here described. The report on Biochemical research contains an interesting dissertation on dental caries pointing in directions where the Institute is preparing to supervise and co-operate. Progress of pathological research on Rous's Fowl Sarcoma is described.

The work of the Routine Section naturally blends at points with that separated as Research. It deals with 101,098 specimens received for examination, 78,846 being bacteriological. The diphtheria bacillus was established in 560 cases, in two cases with absence of typical clinical symptoms; during the last five years the annual percentage of positive laboratory diagnoses of the disease has gradually declined from 24.2 to 16.9. The Shiga type of dysentery infection has continued to be less frequent than the Flexner type. The Widal test is compared with blood culture in a pure and sterile ox-bile medium for diagnosis of typhoid fever. An extensive investigation with respect to the Bordet-Wasserman reaction in the various stages and forms of leprosy is still in progress. Meningococcal meningitis was confirmed in 223 cases (126 native miners); pneumococcal meningitis in 88 cases (69 miners); and a streptococcus was the causal organism of meningitis in 25 cases, several of which had an original mastoid infection; tuberculous meningitis, although not demonstrated, was presumed in a number of cases on cytological and chemical grounds. The plague bacillus was confirmed in 19 of 61 suspected cases; in two of them no recognizable bacilli were detected, but guineapigs inoculated from them developed plague. Of 1,997 rodents examined 7 had the bacillus, one of them being Cuvier's Karroo Cat (*Myotomys unisulcatus*) a first incrimination. Of suspected tuberculous sputa 27,962 specimens were examined—the largest number on record for any other year or any other disease; 4,349 showed the bacilli, about three-fourths of them from miners. Tuberculosis complicated by silicosis was present in 159 cases (91 natives); Silicosis uncomplicated by tuberculosis in 57 cases (8 natives). Pulmonary asbestosis occurred in 2 cases; and asbestosis bodies were found in the lungs of a number of cases with a history of work on asbestos mines for not more than two months. Although 1,389 specimens of serum (not necessarily suspected) were examined, only 14 were positive for undulant fever, and of these only 4 in a degree sufficiently high to warrant a serological diagnosis of the disease.

Several samples of local milk examined for *Br. abortus* and *Br. melitensis* were negative. In two chronic cases, one suggestive of influenza, the other reported to have simulated enteric, a pure culture of *Bact. faecalis, alkaligenes* was obtained from the blood; in both cases a vaccine of this organism is said to have proved efficacious.

In connexion with an inquiry into the conditions of life in the Poor White class in S. Africa 526 blood-films of children of this class were examined; 65 per cent. showed a relative lymphocytosis, 30 per cent. a relative eosinophilia, 14 per cent. a relative monocytosis, and 8.7 per cent. contained malaria parasites. In about 2,056 examinations of surgical material for diagnosis, but chiefly of postmortem material from miners' phthisis cases, 403 cases of malignant tumours were diagnosed histologically, among them 40 of sarcoma, 337 of carcinoma, and 17 of melanoma.

An interesting medico-legal case is described, where ten natives became violently ill (in one case fatally) in ways suggesting an irritant poison, after eating flesh from the corpse of a calf; but *B. enteriditis* was isolated from the vomit and spleen. The ringworm fungi met with during the year were *Microsporon audouini*, *Achorion schoenleini*, and *Epidermophyton rubra*. In 1,199 stool examinations hookworm was found in 523 (Necator 3 times). Other intestinal worms found were *Ascaris lumbricoides* in 47, thread worm in 1, Trichuris in 35, Strongyloides in 3, *Taenia saginata* in 11, *T. solium* in 1, *Hymenolepis nana* in 10, *H. diminuta* in 2, eggs of *Schistosoma mansoni* in 21. Eggs of *S. haematobium* were present in 192 urines. Three Echinococcus cysts are listed. The intestinal protozoa noticed are *Entamoeba histolytica* 333 times, *Chilomastix mesnili* 164, *Trichomonas hominis* 150, *Giardia intestinalis* 160. Of 2,519 blood-films sent for examination 236 were positive for malaria, the benign tertian parasite in 145 and the malignant tertian in 91 (mixed infections of the two in 100 cases). The type and the paper and the format of the Report are a model for the official world.

A. A.

COLOMBO, Municipality of. **Report of the City Microbiologist for 1929** [HIRST (L. F.)].—*Municipality of Colombo. Report XXIV of the Medical Officer of Health, for the Year 1929.* Annexure A. pp. 38-42.

Two-fifths of this report are occupied by statistics of rat-flea surveys. The disquieting feature in the Colombo survey is the appearance of *Xenopsylla cheopis* on rats in a number of premises in a district formerly quite free from this dangerous species. Noteworthy features in the survey of grain ships in Colombo Harbour are the high proportion of *Rattus norvegicus*, and the uniformly high percentage of *X. cheopis* found both on *R. rattus* (95.63) and on *R. norvegicus* (94.95); the ships importing grain come from Rangoon, Bombay, Calcutta, and Singapore, and these facts "strengthen the importance of the ship as a link in the chain of plague infection between an export grainstore overseas and an import one in Colombo." From survey-centres in the Low Country of Ceylon it would appear that the low country "as a whole is an *X. astia* area which has so far successfully resisted penetration by *X. cheopis*." From the Up-Country survey-centres (1,600 to 6,000 feet) the evidence is in striking contrast. Here, between 1,600 and

5,000 feet, *cheopis* appears to be the prevalent flea (and is well represented also at 6,000 feet); and between 1,600 and 3,000 feet *astia* is in a fairly high percentage. On the other hand the percentage of *astia* at 5,000 feet is given as only 0.5 and at 6,000 feet is *nil*. Experiments have been pursued on the use of HCN gas for fumigating flea-infested grain, and a comprehensive report on this subject is promised. Laboratory experiments showed that fleas tend to burrow into a mass of grain to escape fumes that are diffusing slowly. The number of rodents examined for plague in 1929 in Colombo was 24,609, of which 115 were found dead, and 22 were infected. The monthly flea-index ranged between 1.27 in February and 3.38 in March.

Two morphologically distinct types of anthrax were raised from some imported goats, and at least two distinct types of colonies can be isolated from them. The practical importance of these variations is discussed. Investigations of the incidence of leptospira in the city water-supply have been continued; but attempts to exalt their virulence by successive passages through mice and guineapigs have given negative results. Investigations of the amoebae of the monkeys of the Labugama watershed have discovered trophozoites and cysts indistinguishable from *Entamoeba histolytica*, though attempts to infest kittens with them have not succeeded. Results of observations on survival of hookworm are promised in a separate report.

A. A.

SHILLONG. **King Edward VII Memorial Pasteur Institute and Medical Research Institute. The Thirteenth Annual Report for the Year ending 31st December 1929** [MORISON (J.), Director].—26 pp. 1930. Shillong. [9d.; annas 8.]

Thirteen pages of this report are statistical tables (some of which are of purely official interest) relating to hydrophobia.

Of cholera-dysentery bacteriophage 130,823 doses were distributed, its use being now established in all the principal tea-gardens of Assam. A striking instance of its efficacy was observed in an outbreak of cholera in Jakrem, a small village of 744 inhabitants. The epidemic lasted 18 days, and there were 143 cases of cholera. During the first eight days, before the arrival of the bacteriophage, there were 71 cases and 51 deaths. During the last ten days, when the bacteriophage was available, there were 72 cases; 59 of these were treated with the bacteriophage and 52 recovered, the other 13 were not treated with it and all but one died. [See this *Bulletin*, Vol. 27, p. 855.] Reference is made to the discovery by Dr. ASHESHOV (working at Patna) that a potent cholera bacteriophage is a combination of three types, each of which when isolated separately is unstable, and all of which in artificial mixture are unstable; but when isolated from a patient and cultivated all together are remarkably stable.

A. A.

RANGOON. **Fourth Annual Report of the Harcourt Butler Institute of Public Health, Rangoon, for the Year 1929** [ANKLESARIA (J. A.)].—6 pp. With 1 plan & 1 plate. 1930. Rangoon. [As. 6; 7d.]

This short Report states that the Institute has had a busy year and that its activities are expanding. Its greatest need is still a whole-

time Director, but the proposal to recruit a public health analyst has been sanctioned. The flea survey of Rangoon has been completed and a rat survey has begun. Malaria surveys have been started, experiments with mosquito larvicides have been continued, and in this connexion an investigation of the Cyprinodont fishes has been made. In the laboratories the main lines of work have been chemical and bacteriological examinations of waters, analysis of food (particularly of ghee and ngápi) and other condimenta, and analysis of cinchona products and other drugs. Sensitized antidysenteric vaccine has been prepared and issued to three jails in Burma, its early trial having shown a 50 per cent. reduction in the incidence of the disease among the inoculated.

A. A.

FEDERATED MALAY STATES. **Annual Report of the Institute for Medical Research for the Year 1929** [KINGSBURY (A. Neave), Director].—*Federated Malay States Ann. Rep. Med. Dept. for Year 1929*. Appendix I. pp. 51–107.

The Report begins with an excellent review of a very thorough investigation of 164 cases of tropical typhus, of which 139 occurred in a certain class of Tamils on an oil-palm plantation near Kuala Lumpur. Some of this work has been noticed already (this *Bulletin*, Vol. 27, p. 372). The morbid anatomy, histopathology, the transmission to laboratory animals, the serological reactions, the bacteriology, epidemiology, and the sources and transmission of infection are described or re-described. In serial cultures (by methods similar to those employed in European typhus) the virus from man, Gram-negative and pleomorphic, appears in three types, slender fusiform bacilli (or maybe minute cocci or diplococci), "*Rickettsia*," or "diphtheroid," and in virus from inoculated laboratory animals as coccoid, diplococcoid or diphtheroid in form. As previously stated, the disease on the oil-palm plantation attacked in particular Tamil coolies handling the decaying flowers of the palm and the soil around the trunk of the tree; these facts suggested a careful examination of the arthropod fauna infesting the exuviae of the palm, the rats of the plantation, and ultimately of the coolies coming straight from pruning the palm trees. The issue was the discovery, among the 21 species of ectoparasites of 660 rats from Kuala Lumpur and the oil plantation, of 5 new species of Trombidiid larvae, and (very common on rats from the plantation) *Trombicula deliensis*; and, among the ectoparasites taken (in the course of three months) from 464 examinations of pruning coolies, of 88 arthropods the majority of which are larval Trombidiidae. (*Trombicula akamushi* was found to be the commonest mite parasitic on men in the course of this work.) Infection, as shown by lesions and by microbes strikingly like those found in experimentally infected guineapigs, was also discovered in some of 80 rats collected in the plantation. Although the infection has also been transmitted to laboratory animals by the head-louse and the body-louse (from an imported stock) and by cultures isolated from human patients, it is not supposed, in the face of the accumulated evidence from the oil-palm plantation, that lice are the necessary means of intervention.

In Malaria the results of investigations undertaken to determine the factors that influence the infectivity of gametocyte-carriers to

Anopheles maculatus (one of the principal carriers of the infection in the country) are described and tabulated; with *P. falciparum* it is estimated that one gametocyte per 200 leucocytes is probably the lowest limit at which the blood of the patient is infective for that species—an estimate requiring more time for accurate determination by thin smear than hospital practice could afford. Other problems investigated are the value of quinine in the epidemiology of subtertian malaria; the proportion of subtertian cases infective to mosquitoes; and the relative incidence of albuminuria among benign tertian, subtertian, and quartan cases. Systematic observations showed *A. maculatus* to be the dominant anopheles in a growing rice-field; that more individuals of the species were caught in a trap outside the coolie-lines than in the lines; and that in the course of 1,895 dissections of anophelines caught through the year only one, a *maculatus*, was found infected.

Attempts to infect *Macacus cynomolgus* with material from acute cases of Leprosy by inoculation, by inhalation, and by ingestion were unsuccessful. In eight cases treated, "solganal" (containing 36.5 per cent. of gold) appeared at first to have a beneficial effect on this disease and did not induce the leprous reaction. Experiments on the diagnosis-value of a C.F. test, and observations on the results of routine Wasserman and Kahn tests and the influence of antisyphilitic treatment in leprosy are described. Several cases of Leptospirosis in Europeans, contracted by bathing in a public pond, are discussed, and short abstracts of 3 fatal cases in Chinese (2) and Tamil coolies in which the obvious lesions found p.m. were extensive lesions of the liver, some degenerative changes in the kidneys, and various congestions and extravasations. Two severe cases of Tsutsugamushi Fever in European planters came under observation. An investigation of the Anaemia of pregnancy, a condition similar to that described by BALFOUR and McSWINEY as occurring among all communities in India, has been started. Brief abstracts of some cases of Amoebic dysentery treated with "rivanol" conclude with "therapeutic value in amoebic dysentery negligible." Sixteen cases of a painful condition known as Burning Feet, said to be long known among Indians in other parts of the world, have been under observation; it is regarded as a deficiency disease; all the patients were natives of Southern India. In the treatment of Yaws "halarsol," in comparison with novarsenobillon, appeared the more effective, but intramuscular injection caused extensive hard and painful swellings. An investigation of local Pneumococci has begun. Sawah itch, prevalent in Tampin district of Negri Sembilan, is ascribed by the natives to certain snails in rice-fields; search has revealed several species of cercariae in the snails, but so far nothing more.

The accommodation and ménage of the Vaccine Lymph Department has undergone some improvements. Buffalo lymph is used for human vaccination, buffaloes being inoculated with calf lymph which when necessary is rejuvenated by passage through rabbit. The technique of preparing the animal, collecting pulp, and preparing, storage, etc., of lymph follows that practised in Java.

Of liquid extract of rice-polishings 22,333 fl. oz. were issued.

A list of 32 organisms isolated from local water-supplies is given; 751 colonies have been isolated and tested for biochemical reactions.

The Division of Bacteriology deals with routine—serological reactions, prophylactic vaccines, record of bacteriological examinations, water examinations, milk, etc.

The Division of Pathology also supplies the results of anti-rabies treatment (Semple's). Cases treated, 203, none fatal; all cases bitten by dogs, except 2 contacts with rabid calf. (Two fatal cases are recorded, but neither had sought treatment.) Of 165 animal brains sent for examination 72 were positive. 1,328 dogs were inoculated, and 14,857 cc. of canine antirabies vaccine were supplied to the Veterinary Departments; for this vaccine buffaloes were used, being inoculated by the intracerebral route with passage virus.

Among 641 specimens received for diagnosis or obtained at autopsies were 41 cases of benign and 122 cases of malignant tumour; the latter including carcinoma (in variety), adenocarcinoma, epithelioma, endothelioma, fibrosarcoma, sarcoma (in variety), melanotic sarcoma, lymphosarcoma, myxosarcoma, teratoma, rodent ulcer, and Hodgkin's disease, and the patients in numerical order Chinese 64, Tamil 31, Malay 17, Sikh 2, Javan 1, also 6 European and 1 Eurasian.

The Divisions of Chemistry and Entomology deal with routine.

A. A.

GENEESKUNDIG TIJDSCHRIFT VOOR NEDERLANDSCH-INDIË. 1929. Vol. 69. No. 7. pp. 653-663.—Uit het Jaarverslag van het Militair Geneeskundig Laboratorium over het jaar 1928. [**Annual Report of the Military Hygiene Laboratory for the Year 1928.**]

The greater part of the report is occupied with a detailed enumeration and analysis of routine examinations. The total number of these examinations was 16,909, apportioned as 5,153 to the department of tropical pathology, 4,124 to parasitology, 7,285 to bacteriology and 347 to pathological anatomy. Two publications have issued from the section of tropical pathology on (1) *Pyomyositis tropica* and (2) Blood destruction in chronic malaria and other splenomegalies. In the parasitology section researches on blood grouping were continued and in the bacteriological section an investigation into the sterility of emergency dressings soaked in methyl violet was completed.

W. F. Harvey.

GENEESKUNDIG TIJDSCHRIFT VOOR NEDERLANDSCH-INDIË. 1930. Oct. 1. Vol. 70. No. 10. pp. 1002-1016.—Jaarverslag van de Landskoepokinrichting en het Instituut Pasteur te Bandoeng over 1929. [**Annual Report of the Vaccine Establishment and the Pasteur Institute at Bandoeng in 1929.**]

The report summarizes the activities of the institutes, dealing in detail with the production of smallpox vaccine and with antirabic treatment.

Over 23 kgm. of active vaccine was produced, of which was issued a quantity sufficient for over 10 million vaccinations. As far as they were controlled (1·3 million) 97·5 per cent. of the vaccinations were successful.

Antirabic treatment was administered to 980 patients (156 Europeans and 824 natives). Since for a number of patients it could be proved subsequently that the cure was or had been superfluous, the number of patients who rightly underwent the course was 738. Rabies broke out

notwithstanding this treatment in 10 cases (1 European, 9 natives), in all within 30 days from the commencement of the cure.

18,797 pathological specimens were examined for diagnostic purposes.
W. J. Bais.

GENEESKUNDIG TIJDSCHRIFT VOOR NEDERLANDSCH-INDIË. 1930. Sept. 1. Vol. 70. No. 9. pp. 876-896. [15 refs.].—Uit het jaarverslag van het Geneeskundig Laboratorium over 1929. [From the Annual Report of the Medical Laboratory (at Weltevreden) in 1929.]

Most of the subjects dealt with in this report are already published elsewhere. Yet some items may be quoted.

Experiments with mature larvae of *Dracunculus medinensis* in the local Cyclops species, fed to a monkey last year, resulted in infection of the animal with *Dracunculus* as shown by autopsy.

Alteration of the technic of the Wassermann test as proposed by GROSS (*Klin. Wochenschr.* 1928) proved to yield results which did not compare favourably with those of the routine technic of the laboratory. Various flocculation tests (MEINICKE'S M.T.R., KAHN'S test, MÜLLER'S "Ballungsreaktion") yielded favourable results but are to be submitted to further observation.

Subdivision of the non-toxic type of dysentery bacillus was abandoned as the subspecies proved not to possess fixed characteristics.

No satisfactory data are available yet as regards the protective action of the purified anti-beriberi vitamin prepared and delivered by the laboratory. The quantity issued showed an important increase in comparison with 1928. Administered subcutaneously the pure vitamin has no by-effects such as may be brought on by the not absolutely pure preparations and which also occurred in animal experiments with the Japanese preparation "Oryzanine."

W. J. Bais.

WOLFF (J. W.). Jaarverslag van het Pathologisch Laboratorium over 1929. [Annual Report of the Pathological Laboratory.]—*Meded. Path. Lab. t. Medan-Sumatra*. 1930. No. 8. 41 pp. With 6 charts.

Most of the report is occupied with the usual description and tables which set out the nature and extent of the laboratory's activity. Of general interest is the description of a case of tropical typhus with strongly positive Weil-Felix reaction, followed six months later by Kedani mite (*Tsutsugamushi*) disease. In the course of this second infection the Weil-Felix reaction disappeared, only to reappear with convalescence. The case is an important one and is held to substantiate the view that while tropical typhus and Kedani mite disease are closely related affections they are not identical nor does one give rise to immunity against the other.

The figures relating to the possibility of replacement of the Wassermann reaction by the Sachs-Georgi or the Kahn tests are also interesting. Out of 14,249 trials the Sachs-Georgi proved to give a greater or a less reaction than the Wassermann 2,027 times or deviation of 14.2 ± 0.28 per cent., while the Kahn differed 478 times out of 6,814, a deviation of 7.0 ± 0.3 per cent. A great advantage of the Kahn

reaction is the ease with which it can be read to the exclusion of doubtful reactions. The Kahn reaction is evident earlier in syphilitic infection and remains longer positive in treated cases than the Wassermann reaction. It has accordingly been decided to drop the Sachs-Georgi test and use only the Wassermann and Kahn reactions.

W. F. Harvey.

BRITISH GUIANA. Annual Report of the Government Bacteriological Department for the Year 1929 [STEVEN (Geo. H.)].—*British Guiana Rep. of the Surgeon General for the Year 1929*. Appendix I. pp. 66-70.

In the course of routine 820 examples of faex were examined; evidence of ascaris was found in 21, of hookworm in 193, of whipworm in 10, and amoeba-cysts in 5. In 208 cultures of faex *Bact. typhosum* appeared in 18, and *paratyphosum A* and *C* once each, *Bact. dysenteriae* Shiga once and *Bact. dysenteriae* Flexner four times. In 232 urines albumin in excess of 0.05 per cent. was present in 79 cases. In 149 autopsies of Africans (negro and mixed) there were 6 cases of carcinoma of viscera. Cases pointing to cardiac failure as the probable cause of death amounted to 20 per cent. of all autopsies of all races (252), degeneration of the myocardium, and dilatation of the right side (with or without hypertrophy of the left ventricle) being very common features, especially in East Indians. Disease of the kidneys was evident in 19 of 252 autopsies, apart from the fact that in one term of ten weeks (May-July) 21 deaths were registered as nephritis without any laboratory or post-mortem confirmation.

A. A.

MALARIA.

JAMES (S. P.). **Some General Results of a Study of Induced Malaria in England.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1931. Mar. 13. Vol. 24. No. 5. pp. 477–525. With 7 charts, 3 graphs, & 6 figs. on 1 plate.

These observations were made at the Horton Mental Hospital, Epsom, by Colonel James and his colleagues, Dr. W. D. NICOL and Mr. P. G. SHUTE, during the treatment of general paralysis and some other mental diseases by induced malaria. More than 3,000 patients certified under the Lunacy Acts were treated, with the result that nearly 20 per cent. were discharged to their homes. By the method now employed, the malaria is not cut short by quinine, but it is allowed to smoulder. No quinine is given, or only just enough to control the infection and, in half the cases, spontaneous cure of the malaria results. It is surprising how very few malaria patients are infective to anopheles; for example, eight batches of *A. maculipennis* were fed on patients with quartan gametocytes in their blood, with the result that though zygotes appeared in the stomachs of a small number, none contained sporozoites in their salivary glands or proved infective when allowed to feed. In the case of malignant tertian, seventeen feeding experiments at Horton were all negative, and among five selected cases in Rome there was only one good infector. Moreover, the "apparently healthy carriers" of benign tertian—with freedom from fever but not from parasites—always gave negative results when mosquitoes were fed upon them. DARLING stated that at least one gametocyte to every 500 leucocytes was necessary to render blood infective for mosquitoes, but it was found at Horton that the number of gametocytes which exflagellated, and the time required for the process, was a much better indication of infectivity. Benign tertian blood which contained fewer than one exflagellating male to 1,000 leucocytes, after 15 minutes in the incubator at 25° C., always failed to infect *A. maculipennis*. All the male gametocytes in the blood of good infectors exflagellated within 15 minutes, in moist chamber preparations kept at 25° C.

This refers to benign tertian; in experiments with *P. falciparum* and *P. malariae*, the presence of numerous exflagellating gametes did not prove a sure sign that *maculipennis* would become infected. C. W. DANIELS and also B. MAYNE found that by repeatedly feeding a batch of mosquitoes on an infective patient they increased the proportion of infected insects, but this was not apparent at Horton. Individuals of the same species of anopheles varied greatly in their receptivity to infection; some appeared to be refractory. There is some evidence that the endothelial lining of the stomachs of such refractory individuals is less permeable to the vermicules than usual. It is possible that a race of anopheles might arise which would be difficult to infect because of this anatomical peculiarity, and this may sometimes be the reason why a given species is a good carrier in one country, but a poor one in another. Batches of *A. maculipennis* fed on a case of benign tertian and kept in a bedroom in England, during July and August, took 15 days to become infective in two experiments, and 23 days in a third. Control batches in the incubator at 76° to 80° F., dry bulb, and 74° to 78° F., wet bulb, showed sporozoites after 9 days. Feeding on raisins was not deleterious to zygote production or development. BARRAUD's cages were used for transport [see this *Bulletin*, Vol. 27, p. 300].

The numbers of zygotes varied so much in different individuals of a batch that it was concluded that the average number would be of little use for comparing the relative carrying-power of different species. The average quantity of blood taken by an English *maculipennis* was found to be 1.8 milligrams, approximately 1.73 cmm. Investigations made during a period of seven years showed that, in April and May, less than 10 per cent. of the anopheles lived to become infective; during the period August to September, on the other hand, about 50 per cent. survived and became infective. "It is obvious that from the point of view of the spread of malaria, a great abundance of adult *maculipennis* in April and May is much less important than is a scanty prevalence from August to September."

Colonel James does not agree that the presence of sporozoites in the salivary glands of a mosquito, immediately after it has bitten, necessarily means that sporozoites have been injected; he points out that, for this, they must be lying free in the salivary duct at the time of biting, and he attributes many of the failures to non-injection of sporozoites. Of the remaining failures (18 per cent. of all those bitten) some were latent infections, some were so anaemic that their blood was not a good medium for the parasites, and in others the dose of sporozoites may have been too small. In none of the failures was there any reason to suppose that the patient's blood contained immune bodies. In patients who have had previous attacks, on the other hand, an immunity may develop; after there has been a "recurrence" followed by spontaneous recovery without quinine treatment, endeavours to reinfect with the same parasite always fail. Immunity to *P. vivax*, however, does not protect against *P. falciparum* or *P. malariae*; nor does immunity to one strain of *P. vivax* protect (or it only partially protects) against other strains of the same species. (See CIUCA *et al.*, *ante*, p. 119.) Colonel James pleads for the study of immunity in individual children, in a hyperendemic area; starting with the newly born and continuing until the age of natural immunity is reached.

The incubation in patients infected with benign tertian varied within somewhat wide limits. In first infections, caused by mosquito bites, the mean period was 14.1 days; but 11.2 days when caused by blood inoculation. In subsequent infections, the periods were 18.1 and 18.7 days, respectively. There was a tendency for the incubation to become shorter (and—in subtertian malaria—for the attack to be more severe) as the number of bites was increased. In about 3.5 per cent., the incubation was as short as 8 days and, in about the same proportion, it was as long as 25 days. In addition, there were several latent cases, in most of which the incubation period was between 30 and 40 weeks. Attention is called to the duration of this latent period because, in ordinary cases, "a peculiar character of benign tertian malaria is liability to a return of fever and parasites at an interval of between 30 and 40 weeks after the date of the first infection by mosquitoes." For convenience sake Colonel James defines a Recrudescence as a return of fever and parasites within 8 weeks of recovery from the primary attack; a Relapse, as a return between the 8th and the 24th week; a Recurrence, as a return later than this. About half the patients suffered from one or other of these manifestations. Some patients were of a "refractory type" difficult to infect, but, provided a patient had not had a previous attack, there were no failures to infect though sometimes three or four attempts were necessary.

Malignant tertian malaria was transmitted to three patients by the bites of mosquitoes. Details of one case are given as an example of "the ineffectiveness of quinine during the early stages of a malignant tertian fever." The patient, a woman who had never had malaria before, was bitten several times by mosquitoes infected in Rome. Beginning on the third day of the attack, when there were 20 parasites in 100 fields, the patient was given quinine in adequate amounts—the average daily dose was 27 grains—but, after 13 days of this treatment, the fever continued, and the parasites increased. The temperature came down on the 15th day, the parasites disappeared the next day and quinine was stopped. Three days later, there was a recrudescence which was again treated by quinine—24 grains a day, divided into two-hourly doses—but again it failed, for, after 9 days, the patient still had fever, and it took a fortnight to clear the blood of parasites. [SINTON, see below, p. 596, found no instance of quinine resistance among 3,700 patients.]

The tendency of recurrences to appear after an interval of 40 weeks, and of latent infections to have an incubation period of a similar duration, explains the "spring rise" of malaria in northern Europe which "is due to recurrences in persons who had their primary attack in September, together with primary attacks in persons whose infections in September remained latent through the winter." As regards quinine prophylaxis Colonel James considers that it is a method for which no general rule can be prescribed, and that it may be of use in the case of persons engaged on temporary urgent work, such as troops in the field. Quinine given to patients just before and just after the *direct inoculation* of infective blood prevents the development of infection, because the trophozoites are destroyed; but it is ineffective when given during the incubation period, *in cases infected by mosquito-bites*, because it has no action on the sporozoites injected by the mosquitoes. Though it does not delay the onset of the fever it delays the appearance of parasites, and so it is harmful because it thus delays diagnosis. Experiments at Horton showed that if persons who are subjected to mosquito-bites continue to take daily prophylactic quinine, after the incubation period, they suffer from repeated mild attacks of fever at irregular intervals, and, if the daily dose is neglected, they go down with a frank clinical attack within a few days. Fifteen grains once a week was not so effective as 5 grains a day. Regular quinine-takers gain little or no immunity, and hard work or exposure to the sun may bring them down with a severe attack.

Long interval relapses and recurrences do not occur in patients infected by direct blood inoculation, but they occur in 50 per cent. of those infected by mosquito bites. The sporozoites injected in the latter case differ from the trophozoites injected in the former, because they have lived in the tissue cells of the mosquito. It has been suggested that sporozoites enter the red blood corpuscles, where they are sheltered, while merozoites merely attach themselves to the surface. Another theory is that some of the sporozoites enter the cells lining the blood vessels where they remain until the cells break down, months later.

Colonel James does not agree with the generally accepted view that primary attacks are more easy to cure than late manifestations. Europeans who take quinine at the beginning of an attack acquire no immunity, but, in untreated cases of benign tertian, among natives in the tropics, a few small doses of quinine suffice to cure the attack,

because they reinforce a developing immunity. He thinks that the frequency and severity of relapses in benign tertian depend upon the amount of immunity acquired during the primary attack. If quinine is withheld until nearly the end of the attack, immunity is allowed to develop and relapses are rare; "our patients whose treatment with quinine has not been begun until their attack or recrudescence is about to terminate 'spontaneously,' or has actually so terminated, remain free from further manifestations."

When testing the therapeutic efficacy of drugs, the test cases and the controls should be patients at similar stages of their primary attacks. In 32 out of 43 cases of benign tertian at Horton, one dose of 5 grains of quinine, given when the attack had lasted 7-10 days, caused a temporary cessation of fever and a disappearance of parasites which lasted for a period approximately equal to the incubation period of the primary attack. By this method it was ascertained that quinine is more effective in benign tertian than in quartan, and more effective in quartan than in malignant tertian; in malignant tertian, 5 grains of quinine is not sufficient to modify the fever sufficiently to enable the therapeutic course to be continued without risk. The efficacy of drugs may also be tested by an application of the method which ROEHL has used in bird malaria. What is needed in order that this test may be employed usefully in blood-infected human malaria, is that the dosage of quinine should be worked out which will delay, but not entirely prevent, the clinical attack from developing.

W. Fletcher.

HACKETT (L. W.) & MISSIROLI (A.). **The Natural Disappearance of Malaria in Certain Regions of Europe.**—*Amer. Jl. Hyg.* 1931. Jan. Vol. 13. No. 1. pp. 57-78. [17 refs.] [Malaria Experim. Station, Rome.]

Malaria has practically disappeared from certain regions of Europe in recent times without any intentional effort to dislodge it, and in spite of the continued presence of anophelines in numbers far superior to those of regions still intensely malarious. Such areas are usually well-defined zones in the heart of malarious regions and differ in this respect from that extensive borderland at the northern limit of malaria distribution—England and Holland for example—from which benign tertian seems to have been gradually receding in the course of the last century. Such malaria-free zones are Valdichiana and Massarosa, in Tuscany. Anopheline immunity to malaria is not the explanation of this freedom: *maculipennis* from Massarosa can be readily infected in the laboratory, and they are, in fact, regularly gathered and brought to Rome for use in the experimental transmission of malaria for therapeutic purposes and for infection experiments. Nor is the freedom from malaria due to the elimination of gametocytes through the effective treatment, or enhanced natural resistance, of a prospering community. The gametocytes in a malarious population have never been successfully reduced by treatment, or otherwise, to such a point that transmission can no longer take place in the presence of a sufficient number of anophelines. The severe epidemics which follow an unusual invasion by mosquitoes of an area which has been malaria-free for years, show that gametocytes are never absent in such places when they are oases in a generally malarious region. For example, Nemi in the province of Rome has never been malarious, there have never been sufficient

anophelines to insure transmission ; yet, when Lake Nemi was lowered 14 metres to reveal the sunken barges of Caligula, mosquitoes bred on the exposed flats and there was a severe epidemic of malaria, showing that there are apparently always enough gametocyte carriers in a town of this sort to start an epidemic. In certain rural areas of Spain, Sadi de BUEN reports that, in spite of a zero parasite index in December, an epidemic may occur in the summer. "We can no longer consider even a negative parasite index as an indication that anophelines may be allowed to increase in number without danger to the community."

The authors find the answer to the question of "anopheles without malaria" in the lack of contact between mosquito and man. Investigations were made at a small, isolated farmhouse, known as "Casa Bonifica," close to the marshes, in the malaria-free zone of Massarosa. On the ground floor, there were living rooms and a stable containing three cows and a calf ; upstairs there were four bedrooms. There were always many *A. maculipennis* in the stable, but only a few in the bedrooms. On a certain day in the middle of the malaria season, there were 1,626 anopheles (2 per cent. males) in the stable, but only 57 (11 per cent. males) in the bedrooms ; moreover, it was shown by precipitin tests that only three of all the mosquitoes had fed on human blood, while some 1,300 had fed on cows, a ratio of more than 400 to 1 ; which may be called the stabular attraction of the locality. Five farms in the intensely malarious Pontine Marshes were searched for *A. maculipennis*, by way of comparison, with the result that 242, or 39 per cent. of the total catch, were taken in bedrooms and only 372 in stables. Precipitin tests showed that 11, of the 93 females which had bitten, contained human blood, and the rest animal blood. This is an efficient stabular ratio of lower than 8 to 1, and it was associated with severe epidemic malaria, though the bedrooms were large and lofty while the stables were dark, humid and free from draughts. In other places in Italy, well known for freedom from malaria associated with an abundance of anopheles, the same high stabular ratio was found as in Massarosa. Visits to the Dombes district in Southern France (see MARCHOUX, this *Bulletin*, 1930, Vol. 27, p. 194) indicated an even higher stabular attraction.

By way of experiment, the cows at Casa Bonifica were moved into a white tent, put up at the end of the house, and men took their places in the cow-shed. The anophelines now swarmed in the tent, but very few visited the cow-shed after clean straw had been put down. When cow-dung was put into a bedroom, anopheles were attracted into it, but did not bite the men sleeping there. In the zones where malaria has greatly diminished, in spite of the continuous presence of *A. maculipennis*, the quantity of anopheles is much greater than in malarious zones, but they do not feed on man. Such regions are also characterized by intensive cultivation and large numbers of domestic animals. The hypothesis is advanced that those anophelines born with a preference for animal blood have prospered and multiplied to such an extent that they have ousted those with a preference for human blood, since the total number of *A. maculipennis* produced is fixed by the amount of water suitable for breeding. In support of this hypothesis, RAFFAELE, in the authors' laboratory, has developed two strains of *Culex pipiens*, in eight generations, one of which will eagerly attack canaries, while the other will starve to death in the presence of these birds. Other strains of *C. pipiens* occur in nature which will not touch human or avian blood, but feed only on reptiles. The authors

did not find any anatomical differences between the zoophilic and homophilic strains of *A. maculipennis*. They do not believe that the type of building, in Southern Europe, has much influence on the number of anopheles. In a highly malarious region, like Fiumicino, in Tuscany, *A. maculipennis* will try to enter the bedrooms of the new houses in the settlement built for ex-service men, neglecting the unscreened cow-sheds; in malaria-free Tuscan Valdichiana, on the contrary, no *A. maculipennis* are found in the badly lighted, ill-ventilated rooms of the ancient and massive medieval farmhouses, in which a previous generation suffered from malaria, in spite of the fact that these anopheles are far more numerous in Valdichiana than in Fiumicino, and they swarm in the cow-sheds. It is the presence of a certain kind of food supply which, by instinct, attracts certain races of mosquitoes. "The numerical predominance of the zoophilic strain must be almost absolute to eradicate malaria . . . an efficient animal barrier cannot be improvised about a human dwelling. Protection from malaria by domestic animals rests on a process of biological selection, and not on the chance that the mosquito will bite an animal instead of a human being."

W. F.

LEAGUE OF NATIONS. HEALTH ORGANISATION. **Malaria Commission.**
Report of the Malaria Commission on its Study Tour in India
(August 23rd to December 28th, 1929). C.H./Malaria/147.
L.o.N.P. III. Health. 1930. III. 9.—77 pp. With 1 map &
46 figs. on 11 plates. Geneva. 1930. Aug.

The following members of the Commission took part in the tour: W. A. P. SCHÜFFNER, N. H. SWELLENGREBEL, Louis WILLIAMS, S. de BUEN, M. PELTIER, and M. CIUCA. Their report is prefaced by A Note on Malaria Research and Prevention in India, written by Colonel CHRISTOPHERS, which is particularly valuable because it contains his views on India's malaria problem.

"The great mass of India, with its population of 319 millions, nearly one-fifth of the population of the whole world . . . comes under conditions which may be described as a varying but often moderate endemicity. Further, 90 per cent. of this population is living under rural conditions [barely 7·8 per cent. can read or write]. This vast illiterate teeming mass of humanity, living in 687,935 towns and villages, is the real malaria problem of India. . . . Many of the villages have a considerable population, say from two to five thousand. Roughly speaking, no funds are available other than will just serve the needs of conservancy, etc. . . . In the vast bulk of the population is the conservative spirit of those whose ancestors have always lived as they have—communities whose combined resources are woefully small—so poor that they practically cannot be taxed in the western sense, lacking in public spirit, with a tremendous amount of ignorance and apathy, having no 'health conscience' or even any adequate appreciation of what is in the mind of the sanitarian who may attempt to rouse their enthusiasm in such cause. Education in hygiene, not malaria prevention, is the only outlook one can see at present to this vast problem of rural sanitation. Schools, . . . , travelling dispensaries, district health officers . . . a hundred and one methods, but not yet anti-larval operations. . . . Malaria prevention for plantations, industrial concerns, towns and cities and many other circumstances is one thing, a claim that rural malaria in India 'is preventable' and therefore why not 'prevented' is simply a quibble of ignorance."

The Commission, in their Introduction, draw attention to the fact that owing to the variety of conditions it is impossible for the Central Government to institute a general scheme of anti-malaria control. The number of civil surgeons is so small and their duties are so heavy, that even by working twelve hours a day and spending only two hours in each village in their district, they would need two or three years to get round them.

In the provinces the mortality from fevers, most of which are attributed to malaria, is higher than from any other disease: 48 per cent. of all deaths in Mysore, 40 per cent. in West Bengal, 32 per cent. in Central Bengal. The death rate is based on figures compiled on the village Chaukidar system. The village watchman, or Chaukidar, goes once a week to the police-office of the headquarters of the Thana (or sub-district), and recites what he remembers of the last week's births and deaths, including the cause of deaths according to his own views; he is usually illiterate and cannot fill in the register himself. The Commission "considers it to be one of the primary duties of the Government to arrange for adequate medical assistance." In rural areas quinine can be obtained at the dispensaries, police-stations, post-offices, schools, etc., but "in the absence of any further organisation . . . this may be pronounced insufficient . . . adequate quinine distribution cannot stop at ensuring the presence of a sufficient quantity of quinine in every village. . . . *Without quinine distributors, quinine distribution is almost useless.*" The Commission are of opinion that quinine distribution and all rural medical assistance should be undertaken by the Public Health Department, leaving only the large hospitals in the cities to the Medical Department. This would give the Public Health Department a stronger hold on the population, which is at present not sufficiently educated to appreciate prevention of disease. "*A rural public health department in India should cure and should therefore discharge likewise the functions of a medical department. The distinction between these two departments, perhaps suitable for European conditions, appears to us wrong in principle in India.*" (Compare GIGLIOLI, *ante*, p. 131.)

The four chief local malaria problems are: A, the urban; B, the Punjab; C, the Bengal delta; and D, the hill malaria problem. These are dealt with seriatim.

A. Malaria in the cities. This is due to *A. stephensi*, which breeds in wells inside houses and in closed cisterns on the house-tops. These mosquitoes do not need to leave the house to deposit their eggs and are therefore domestic, both in their adult and larval stages. That this knowledge, due to BENTLEY and COVELL, has yielded so little result in Bombay and other cities is partly due to religious opposition and partly to the lack of co-operation between the four main governing bodies, namely the city corporation, the port trust, the railways, and the provincial government. "If the people and the local boards in the city of Bombay could set aside personal feelings, political animosities and religious scruples, and could combine to drive out the enemy from a position that has only been tenable through mutual discord in the attacking force, we believe that a moral impetus of no mean value will be given to the rest of India."

B. The Punjab problem. This could hardly be called serious were it not for occasional outbreaks of terrible and widespread epidemics sweeping over the whole province. It is probable that these epidemics

take their origin in various localities where malaria is always highly prevalent; but whether these permanent foci are due to a greater accumulation of *A. culicifacies* is a matter which requires much more investigation. If the persistence of malaria in such places is due to a high anopheline density, it may be possible to attack the problem by anti-larval work limited to these endemic foci. The western part of the Punjab was a desert until it was irrigated by huge canal systems. During heavy monsoons the land is often flooded, an unmitigated calamity to the wheat and other dry crops grown in the country. Irrigation has raised the level of the subsoil water, the flood water cannot get away and the soil becomes water-logged. The numerous permanent collections of water in these areas provide breeding facilities for *A. culicifacies*; moreover many of the water-logged areas are thrown out of cultivation by the formation of deposits of mineral salts (see McCombie YOUNG, *ante*, p. 106). The epidemics which follow floods are not, according to GILL, due to an increase of anopheles, the density and distribution of which remains constant, but to (1) the length of time since the last epidemic, with proportionate diminution of immunity of the population; (2) adverse economic conditions caused by floods, especially if following lean years of drought; (3) increased humidity prolonging the life of anopheles and rendering them better transmitters.

C. The Bengal Delta. This is a wet crop country growing rice, cane and jute. The eastern part of the delta is healthy, the western part is malarious. In the healthy part, the rice grows in swamps with water rushing through them from the rivers, full of rich fertilizing silt which it deposits when the rains are over. In the unhealthy parts there is plenty of water, but it comes from dead rivers and tanks; it is not running water, it carries no fertilizing silt, the crops are poorer, and the economic conditions are less satisfactory. The water is stagnant and grows many weeds which provide edge for mosquito breeding. BENTLEY's theory is that the absence of malaria in eastern Bengal is due to the circulation of silt-laden river water. A century ago, the fields in western Bengal were as healthy as those in the east, but in those days the dead rivers were maintained as irrigation canals, and they carried silt-laden flood water. Nowadays, owing to changes in the administration of taxation, these canals are no longer kept open, and they have been still further blocked by roads and railways which keep the fertilizing flood water off the land. Anopheles (*A. philippinensis* and *A. minimus*) are as plentiful in one district as in the other, but while their maximum prevalence coincides with the malaria season in the unhealthy west, it occurs much later in the healthy east, because anopheles will not breed in the flood water until it has become clear of silt, after the rains and the malaria season are over. BENTLEY's scheme is to re-establish the old system of irrigation, by dredging the canals and removing obstructions; no special anti-larval measures are needed; it will not prevent anopheles breeding, but will render them harmless. RAMSAY (this *Bulletin*, 1930, Vol. 27, p. 637) found a similar problem in Assam, where *A. minimus* is as numerous in the healthy low-lying plains, at the foot of the hills, as it is in the malarious tea-estates at a higher level. Here again, the peak of anopheline density coincides with the malaria season in the unhealthy hills but not in the healthy plains. In the winter, when the rains are over and the water in the plains is clear, *A. minimus* breeds more abundantly there than in the hills, but when the rains come and the low country is flooded

with silt-laden water, the mosquitoes disappear from the plains and are abundant in the hills. Why the anopheles do not transmit malaria when breeding in their winter resorts in the plains of southern Assam is just as incomprehensible as why *A. philippinensis* and *A. minimus* do not transmit malaria during November in eastern Bengal.

D. Hill malaria. The streams in the hills proper, which may be rushing torrents in the rains, run quite dry when they are over, or leave seepage and pools. In the gently sloping area of the foot-hills, the streams slow down, and follow a meandering course in deep ravines with wide beds, usually in light soil, forming frequent swamps. The foot-hills of the mountains are sparsely populated, the soil is rich, and they are often suited for growing tea; therefore they invite immigration. In the United Provinces, Rohilkand, and north-west Bengal, the foot-hills are known as the Terai; in north-east Bengal a similar area is called the Duars.

"Malaria in these areas appears in its worst form, if the immigration is not accompanied by adequate medical and economic measures. . . . In the Rohilkand Terai . . . the spleen rate is almost everywhere over 90 per cent. . . . and a general mortality of almost a hundred, against a birth rate of half this figure, quickly wipes out one village after another, so that the average lifetime of each village hardly exceeds ten years. . . . Conditions greatly improve if the immigrant population is well-housed, well-fed, well-cared for medically and sanitarily, even without any special anti-malarial precautions. With the latter, many a 'death-trap' has been changed into a health resort." (See CLEMESHA, below, p. 576)

A. listoni, *A. minimus* and *A. maculatus* are the principal vectors; they require clear water without silt, not too densely shaded. They must be very potent carriers, because they maintain a high spleen rate though they are usually present in only small numbers. Here is an unsolved problem; one would expect an unusually high infection rate among them, but this is seldom found.

The Report deals next with the control of malaria in agricultural, industrial and military centres. Mian Mir, now known as Lahore Cantonments, was visited by the Commission, and their remarks on the original anti-larval operations are full of interest. They were convinced that if these operations had been still in progress at the time of their visit, Mian Mir would have been shown to them as a successful piece of work. "What Mian Mir showed was that this kind of work as carried out by Christophers and James cannot be done cheaply and easily and that, as soon as it is stopped, the results are quickly lost. We do not believe that recent anti-larval work carried out under similar circumstances has in any way disproved the lesson of Mian Mir." The Public Health Department in Bengal has founded an experimental station in the tea-garden Meenglas (Duars), where all the streams are converted into subsoil drains for a radius of half a mile from the cooly-lines, and for half a mile further they are oiled. Local opinion holds the results to be satisfactory, a reduction of 40 to 70 per cent. in the spleen rate having been noted since 1917. "Unfortunately, these results are not constant, as our own examination showed a spleen rate of 89 per cent. among the children." On the other hand, the anti-larval work carried out by RAMSAY in Assam has reduced the spleen rate on his estates from 70 to 10 per cent. The Commission, with their experience of far-flying anopheles in Europe, Africa, and Indo-China, found it difficult to believe that a half-mile radius could be sufficient, and where there are many breeding places

just outside the limit it is not ; but, they say, " we gladly admit that in many instances it would have been hypercritical on our part not to accept the convincing evidence. Still, we should feel grateful if special investigations into the range of flight could be taken up." They lay great stress on the importance of statistical observations showing the trend of malaria in the untouched districts surrounding an experimentally controlled area. Without such observations, there is no proof that any reduction of malaria, which may occur, is anything more than a general symptom in that part of the country. Rural malaria control in India is practically limited to selected groups, such as troops or labourers on estates, mines, railways, and public works ; the Commission saw no instance of an all-round malaria control of any of the ordinary villages in which 90 per cent. of the people live. " Finally, we are certain of one thing," they say. " Public health work is much hampered by lack of funds. Unless there is more money available . . . we fear that anti-malarial work cannot be extended. Public health has been transferred to self-government. Consequently, the people, who elect their representatives, can provide public health or not as they like."

W. F.

PELTIER. Lutte antipaludique aux Indes Anglaises. [**The Anti-Malaria Campaign in British India.**]*—Ann. de Méd. et de Pharm. Colon.* 1930. July-Aug.-Sept. Vol. 119. No. 3. pp. 418-434.

The author records the impressions of a five-months' tour in India as a member of the League of Nations Malaria Commission (see above). There is a central organization for the study of malaria, the Malaria Survey, with a field experimental station at Karnal, where 20 to 25 medical men, yearly, are trained in the methods of investigating the disease. The central organization advises the provincial authorities on methods of malaria prevention, and assists them by making the surveys which are the necessary preliminaries to action. But there is no central body for carrying out preventive measures, nor is there any comprehensive plan for dealing with malaria. All problems of hygiene and public health are dealt with by district boards, municipalities, and the like, who are often too ignorant to appreciate the importance of anti-malaria measures, and refuse to vote the funds necessary for their execution. Prophylactic quinization has been abandoned in the army, and it is impracticable for the mass of the population. The use of the mosquito-net is confined to the European and the well-to-do ; it is unknown to the bulk of the natives. Anti-larval measures have proved efficacious in limited areas where groups of people are collected together for the purpose of their work ; on mines, agricultural estates, railways, and public works. India has its town malaria ; there is malaria in Bombay, Lahore, Delhi and Lucknow. This is principally due to *A. stephensi*, which has habits like those of *Aedes aegypti* and breeds in wells, jars, buckets of water, etc. It also breeds, together with *A. culicifacies*, in the ponds and water channels within the magnificent gardens of some of the native mansions. Here anti-larval work is hindered by lack of public co-operation and popular opposition. It is difficult to believe that anti-larval measures can be applied to the vast rural areas. Possibly something may be accomplished by attack-

ing only the dangerous anophelines ; experiments on these lines have been made by the Rockefeller Foundation in Mysore. The methods adopted in the Punjab and in Bengal aim at increasing the resistance of the population to disease by raising the standard of living through improvements in agriculture and irrigation.

W. F.

CLEMESHA (Wm. Wesley) & MOORE (J. H.). **Five Years' Anti-Malaria Measures on the Travancore Tea Companies' Estates.**—*Indian Med. Gaz.* 1930. Dec. Vol. 65. No. 12. pp. 671-683.

This paper describes the successful employment of plasmoquine with quinine as an antimalarial measure, in a *labour force under complete disciplinary control*. The authors conclude that anti-gametocyte campaigns can be easily carried out with success on estates, but that "*such a thing is practically hopeless with a civil population.*" A reduction of even 70 per cent. of the carrying species of anopheles may be useless if there are many human carriers. Similarly, a reduction of 70 per cent. of the gametocyte carriers will avail little if large numbers of efficient anopheles are present. [See also MANALANG, below.] "Manifestly the only really scientific and mathematically correct method of stopping reinfections is to get the maximum reduction in the number of anopheles and the maximum reduction in the number of gametocyte carriers at the same moment." It is very important to carry out preventive measures at the right time of the year. In Travancore, the period of anopheline activity is March, April, May (the dry hot weather season), and June until the rains come and wash them away. Ninety inches of rain usually fall between June and September. Anti-gametocyte work is begun in February, in order to sterilize the carriers before the arrival of the mosquitoes. Anti-larval work is begun on March 1, or before if larvae are found ; thorough oiling is carried out at weekly intervals, and the anophelines are never allowed to increase above the winter level ; if the work were begun later, this object could not be achieved. In order to free the children from parasites, they are given the tasteless euquinine in sweetened condensed milk, and they take it with alacrity. In a badly infected group, small doses of plasmoquine are added twice a week. The anti-gametocyte treatment of adults consists of quinine and plasmoquine. During the first week, two cinchona febrifuge tablets, grains 5 each, are given every morning, and one is given at night. One tablet of plasmoquine compound is also given every night. During the second week, only tonic pills are given. During the third week, the first week's treatment is repeated. This course is given to all fever cases and to chronic relapsing cases.

Before the institution of this treatment, though vigorous anti-larval work was in progress, 34 per cent. of all the blood films examined contained gametocytes ; after it had been in force for a year less than 5 per cent. of the slides contained gametocytes. The superiority of anti-larval work combined with anti-gametocyte treatment, to anti-larval work alone, is also demonstrated by figures from three other tea estates, where vigorous antimalaria measures were carried out, but no plasmoquine was given. On one, the number of cases of malaria per 100 coolies was 29 ; in another, 11 ; and in the third, 18. On the

five estates where plasmoquine was used, the numbers were 3, 3, 9, 5, 9. The cost of the antimalaria campaign during the year 1929-30, including oil, milk and euquinine, was just under 6,000 rupees, for the five estates comprising some 5,000 acres and employing about 3,000 coolies. The tea estates where this work was carried out are situated in the Periyar valley of the Travancore hill country which is notoriously malarious. Across it, blocking the Periyar river, is the great dam with a lake of 20 square miles behind it. As a result, the river below the dam is seldom flushed out, and is reduced to a chain of pools in a rocky bed. *A. culicifacies* is responsible for most of the malaria, and, in the ravines on the hillsides, *A. maculatus*, *A. funestus* var. *listoni*, and *A. aconitus* are found. Before antimalaria work was started in 1926, it frequently happened that 75 per cent. of the coolies were too ill to work; at the end of May, it was not uncommon to find a parasite rate of 100 per cent. in the cooly-lines, and, after a bad year, many deaths occurred from malarial nephritis during July and August. Since 1928, there have not been 10 serious cases of malaria; the labour out-turn, even in May, is 98 per cent., and the death rate per thousand, from all causes, is only about 20 per thousand. In 1930, malaria practically ceased to exist, so that the regular dosing of children was discontinued.

W. F.

RECORDS OF THE MALARIA SURVEY OF INDIA. Calcutta. 1930.
Dec. Vol. 1. No. 4. pp. 429-565. With numerous illustrations.

The first paper is a note written by Major SINTON, at the request of the Malaria Commission of the League of Nations, dealing with researches to determine the relative values of the cinchona alkaloids in the production of a permanent cure in malaria. The second paper, by the same author, also deals with the relative value of these alkaloids. These two papers cover the same ground as that by the same author published in the *Indian Medical Gazette* (see below, p. 596). No case of quinine resistance was found among nearly 3,400 patients. The results of the analyses of several samples of cinchona febrifuge are given, which demonstrate the great variations in the composition of this substance. It is recommended that a standard of at least 50 per cent. of crystallizable alkaloids should be adopted, and that the amount of quinoidin, which appears to be the main cause of the unpleasant by-effects, should be diminished. *C. ledgeriana*, the cinchona tree which gives the highest yield of quinine, is delicate and costly to grow. The more hardy *C. succiruba* gives less quinine but more of the other, equally effective, alkaloids. It should be cultivated on a large scale for the production of a cheap cinchona febrifuge.

Dr. RAO, special Malaria Officer, Madras, contributes a note on the survey of Madras, which has been conducted during the last 3½ years. *A. culicifacies* is almost the only carrier. It breeds in pools formed by the rains, and in irrigation channels; attention directed solely to its breeding grounds would make many villages and small towns healthy. "The crux of the problem still is the areas under . . . irrigation. . . . On account of the conflicting interests of the several authorities concerned, no progress has been possible."

The next paper, by Colonel SHORTT, deals with spleen rates in the Garo Hills.

Captain CHALAM recommends Paris green for the treatment of ponds and tanks which are used for bathing and drinking. Oil is objectionable. Mosquitoes avoid water which has been treated with oil and lay their eggs elsewhere. They oviposit in water treated with Paris green, and the resulting larvae are killed by the next application. Water so treated acts as a mosquito-trap. Paris green penetrates vegetation and kills the larvae underneath. The thicker the vegetation the more Paris green is needed—1 lb. per acre in rice-fields, 2 lbs. per acre in water-hyacinth areas. A 1 per cent. dilution with powdered soapstone is employed.

Major COVELL and Subadar BAILY report on malaria in Sind (see YOUNG and MAJID, *ante*, p. 106).

W. F.

COVELL (G.). **The Malaria Problem in Bombay.**—Reprinted from *Jl. Bombay Natural Hist. Soc.* 1930. Nov. 15. pp. 736-742. With 1 map. [4 refs.]

Malaria has been present in Bombay since very early times. In 1908, there was an outbreak in connexion with the building of the Alexandra Dock, and Captain W. G. LISTON found that 25 per cent. of the *A. stephensi* caught in the neighbourhood were infected with parasites. Dr. C. A. BENTLEY confirmed this, and found that the principal breeding places were the house wells. A special malaria department was created on his recommendation, but this was abolished in 1918. Soon afterwards, partly on account of building operations, the disease increased; the crews of ships were infected in the harbour, members of the medical staff were infected in St. George's Hospital, and business was disorganized in the City to such an extent that 40 commercial houses sent in a petition to the Corporation, with the result that, in 1923, the malaria department was reconstituted. The only common anopheles in Bombay are *A. subpictus* ("*rossii*"), which is harmless, and *A. stephensi*. The latter will breed in dark places where the water is cold, or in roof cisterns exposed to the blazing sun; and it will pass through the narrowest openings to reach its breeding places. The permanent breeding places are: wells, cisterns, fountains, tubs, wet cellars, garden fountains, etc. It prefers fresh water. Its temporary breeding places are: roof gutters, tins, hollows in machinery, etc. The author found, during a survey made in 1928, that the disease was less prevalent in the neighbourhood of the Alexandra Dock than it was at the time of BENTLEY's survey, 17 years before, but it was far more widely diffused. This diffusion appears to be due to an enormous increase in the number of cisterns and to the installation of water-waste-preventers in connexion with a water-carriage system of conservancy. There are grave obstacles to the carrying out of preventive measures in Bombay: "various parts of the island are controlled by different authorities, the lack of co-operation among these authorities, the religious and sentimental objections to the closure of wells and the tendency to drag public health matters into party politics." (See LEAGUE OF NATIONS, above, p. 571.)

W. F.

RAMSAY (G. C.). **Some Findings and Observations in an Anopheline Malaria Infectivity Survey carried out in the Cachar District of Assam.**—*Indian Jl. Med. Res.* 1930. Oct. Vol. 18. No. 2. pp. 533–552. With 3 folding graphs. [8 refs.]

Between April 1927 and March 1930, anopheles to the number of 42,300 were caught and dissected. Fifty-nine specimens of *A. minimus*, out of 3,874, were found to be infected, 27 of them with sporozoites. Not a single infected *A. maculatus* was found among 3,374 examined. *A. aconitus*, *A. philippinensis*, and *A. hyrcanus* were also found negative although many thousands were examined. The author concludes that *A. minimus* is practically entirely responsible for the transmission of malaria in tea estates in the Cachar district of Assam. *A. maculatus* and *A. aconitus* are notorious carriers in the Malay States, and *A. philippinensis* is a carrier in Bengal. In Assam, these species prefer to feed on cattle rather than man, and to this predilection Dr. Ramsay attributes their freedom from infection; in the Federated Malay States the coolies do not keep large herds of cattle, as the settled tea garden labour forces do in Assam. On one tea estate, with a spleen index of over 80, more than 2,000 specimens of *A. maculatus* were examined with negative results, although more than 2 per cent. of *A. minimus* were infected. It is interesting to note that it was difficult to find adult anopheles on the estates where anti-larval measures were in force; so rare were they that Dr. Ramsay offered a reward of 2 annas for each specimen of *A. minimus* or *A. ram-sayi*, and a rupee for those found to be infected with malaria.

W. F.

RAMSAY (G. C.). **The Malaria Problem of Assam.**—*Jl. Trop. Med. & Hyg.* 1930. Dec. 1. Vol. 38. No. 23. pp. 352–357. With 2 text figs. [4 refs.]

The author concludes, as the result of finding *A. minimus* breeding in a masonry-built well, that it will also breed in concrete inverts if they are not properly graded; i.e. mosquito control by inverts is dependent upon velocity of current. In masonry-built wells the light must be kept out by a suitable covering. In certain highly malarious sites, the breeding of *A. minimus* should be prevented by planting trees to shade the water.

W. F.

WATSON (Malcolm). **The Saving of Port Swettenham.**—*Jl. Trop. Med. & Hyg.* 1930. Dec. 1. Vol. 38. No. 23. pp. 351–352.

The classical story of the saving of Port Swettenham is briefly told. Five months before the port was opened, the author reported to the government of the Malay States that "the Government staff shortly to be stationed there will be seriously affected." The predicted epidemic of malaria occurred, and was so severe that the High Commissioner telegraphed from Singapore ordering the closing of the port. Through the intervention of the author this order was suspended until the anti-malaria scheme which he recommended had been carried out. Thus "the port was saved . . . so began the great anti-malaria work of the

Government of the Federated Malay States, which was followed by that of the Government of the Straits Settlements, planters and others, with the results described in Major Walker's paper." (See WALKER, this *Bulletin*, 1930, Vol. 27, p. 630).

W. F.

MESNARD (J.) & BORDES (L. A.). L'importance du réservoir de virus autochtone dans la lutte contre le paludisme en Indochine. [The Native Population as a Reservoir of Malarial Infection in Indo-China.]—*Bull. Soc. Path. Exot.* 1930. Oct. 8. Vol. 23. No. 8. pp. 811-820. With 1 text fig. [6 refs.] [Pasteur Inst., Saigon.]

The native Mois are heavily infected ; 43 children from 3 villages all had enlarged spleens, and nearly all of them had parasites in their blood. The death rate among the children is high, but in adult life tolerance is established and, though ill health is common, acute attacks are rare. When new land is being opened up, the native Mois are employed to fell and clear the jungle, and to make roads ; building and planting are done by imported Annamite and Tonkinese labour supervised by Europeans. These susceptible immigrants, living and working side by side with the native Mois, become heavily infected and the results are disastrous. For example, 130 coolies were imported from Tonkin by the P.W.D., for building a bridge ; they suffered terribly from malaria and only 77 were left after 15 months. Some months later, a commercial company took over the construction, but their coolies remained healthy. *A. maculatus* was breeding freely in the river bed, and the conditions were the same in both cases, except that in the latter the native labour was encamped several kilometres away from the imported coolies.

W. F.

MORIN (Henry G. S.). Note sur le développement d'une campagne antipalustre en Cochinchine. [An Antimalaria Campaign in Cochinchina.]—*Ann. Inst. Pasteur.* 1930. Nov. Vol. 45. No. 5. pp. 641-659. [Pasteur Inst., Saigon & Pasteur Inst., Paris.]

The Mekong Delta with its rice fields was formerly the most important part of the colony, and malaria was comparatively rare. The jungle-covered highlands—the red earth, laterite country—is now being developed by the rubber-planter, and malaria rages in the newly opened country. The red earth districts are particularly unhealthy ; coolies who have worked happily in grey earth country are attacked when they are transferred to a red earth estate. Sometimes health can be preserved if the coolies sleep at night outside the red earth district where they work by day. Apart from *A. vagus*, *A. maculatus* is the anopheline most frequently found in the larval stage, in the neighbourhood of dwellings infested with malaria. The larvae of *A. minimus* are found in smaller numbers, but adults of this species are more numerous in the cooly-lines than *A. maculatus*. Very few anophelines of any kind are found in the houses during the daytime, but if a night visit is made, they are buzzing with *A. maculatus* and *A. minimus*. Twelve out of 181 *A. minimus* were found to be infected, and on

epidemiological grounds it is almost certain that *A. maculatus* is also an important local carrier. Measures directed against these two species at several centres have produced a rapid reduction of sickness at these points. [See MORIN, *ante*, p. 112.]

W. F.

BEDIER (E.). Quelques considérations sur le paludisme au Laos. [**Malaria in Laos.**]—*Ann. de Méd. et de Pharm. Colon.* 1930. Apr.–May–June. Vol. 26. No. 2. pp. 201–218.

The French colony of Laos stretches along the left bank of the Mekong River in Indo-China. Part of the country consists of rice fields in flat plains, part of it is mountainous. The greater part of the scanty population lives in villages along the banks of the river and its tributaries. Malaria is the scourge of the country, and 22·7 per cent. of the hospital admissions are due to it. Most of the severe cases occur among immigrant Annamites and Europeans, but malaria causes a high mortality among the native Laotian infants and children, and in many places the splenic index is over 80 per cent. Quinine is distributed without charge, but without much benefit; the natives are quite willing to swallow it when it is given to them, but they will not trouble to come to the dispensaries to get it. The native huts stand in undergrowth, sheltered by the branches of large trees, and it is suggested that clearing would be beneficial. The author also recommends the formation of a special antimalaria service, with travelling units to visit the villages. [MORIN, see above, states that the chief carriers are probably *A. maculatus* and *A. minimus*. If this is true for Laos, clearing in the hilly country might be disastrous.]

W. F.

CARTER (Henry F.). **Observations on Epidemic Malaria in the South-western Lowlands of Ceylon.**—*Ceylon Jl. Sci.* (Sect. D. Med. Sci.) 1930. Nov. 7. Vol. 2. Pt. 4. pp. 177–189. With 4 figs. on 1 plate, 1 text fig. & 1 map. [3 refs.]

While approximately three-quarters of the low country of Ceylon is severely malarious, the remaining quarter—which stretches 22 miles up, 100 miles down, and 30 miles inland from Colombo—is not so, although the physical and climatic conditions of the district are such as would appear to be distinctly favourable to malaria. The key to the problem is probably the fact that, in these south-western lowlands, the notorious *A. culicifacies* and *A. funestus* are uncommon, while they are prevalent in the more malarious districts. Though these mosquitoes are scarce, their presence, even in small numbers, is a continual menace whenever artificial conditions are created which favour their increase, and several epidemics have occurred in the malaria-free lowlands. These epidemics have been strictly localized, associated with agglomerations of people imported into the neighbourhood in prisons or labour camps, and with prolific breeding of *A. culicifacies* in quarries or constructional works.

W. F.

CARTER (Henry F.). **Further Observations on the Transmission of Malaria by Anopheline Mosquitoes in Ceylon.**—*Ceylon Jl. Sci.* (Sect. D. Med. Sci.) 1930. Nov. 7. Vol. 2. Pt. 4. pp. 159–176. With 3 text figs. & 4 figs. on 1 plate. [1 ref.]

Investigations were carried out on a coconut estate near Chilaw, a coast town 50 miles north of Colombo, during the two years 1927 and 1928. The spleen rates of the children varied from nil to 100 per cent., and their parasite rates from nil to 30 per cent. *A. culicifacies* formed 87 per cent. of all anophelines caught in the cooly-lines and 3 per cent. of them were found to be infected with malaria parasites. The highest rate of infection in mosquitoes was during December, January and February; the highest rate of infection in children was from February to March. No infected mosquitoes were found in June, July, or October. No species other than *A. culicifacies* was found infected.

The most prevalent anopheline larvae were *A. culicifacies*, *A. funestus* var. *listoni*, *A. hyrcanus*, and *A. subpictus*. *A. culicifacies* was most abundant in unshaded trenches situated near the lines. *A. funestus*, on the contrary, showed a distinct preference for shade. (See CARTER and JACOBS, this *Bulletin*, 1929, Vol. 26, p. 947.)

W. F.

UNION OF SOUTH AFRICA. ANNUAL REPORT OF THE DEPARTMENT OF PUBLIC HEALTH. YEAR ENDED 30TH JUNE, 1930. Annexure "C." pp. 74–76.—**Malaria: Administrative Position and Preventive Measures. Memorandum by the Department of Public Health.**

In this memorandum the Department of Public Health informs owners and occupiers that they are themselves responsible for carrying out measures against mosquitoes on their own land, and that it is the duty of local authorities to see that they do so, and to co-ordinate and assist their efforts. The Government is responsible for carrying out research and for giving advice on malaria problems. During last malaria season the Government employed 2 malaria officers, 5 inspectors, and a number of assistants in making malaria and mosquito surveys. Professor SWELLENGREBEL has been commissioned to make an extensive investigation, and was due to arrive in October 1930. A special malaria section has been established in the Department of Public Health, and a great deal of investigation as regards the mosquito carriers and their biology has been carried out in conjunction with the South African Institute for Medical Research. For some years past the Government has spent large sums on the free distribution of quinine.

"We sometimes hear of the 'eradication' of malaria in some particular locality—the Panama Canal zone or some tropical or sub-tropical town, mine, or estate. This term is apt to mislead the uninitiated; it is almost invariably used in a relative sense—meaning that the disease, as a result of vigilance and careful and continuous precautions, is being more or less completely prevented or kept at bay; when these precautions are relaxed or discontinued, malaria returns. It is true that by measures such as drainage of swamps and complete removal of all mosquito-breeding places in a particular area, malaria can sometimes—under very special conditions—be completely and permanently eradicated, but such measures are very expensive and of very limited application."

W. F.

WATSON (Malcolm). **Observations on Malaria in the Union of South Africa.**—*Union of South Africa Ann. Rep. Dept. Public Health Year ended 30th June, 1930.* Annexure "B." pp. 66-73.

The author's inquiries were limited generally to three areas. One included Munnik and Tzaneen; the second, the Nelspruit area; and the third, the Natal coast. His general conclusion is that much more investigation is necessary before any extensive anti-malaria schemes are adopted. "I would most earnestly recommend the Union Government," he writes, "to place its entomological and malarial knowledge on a sound scientific footing before it initiates any campaign for the control of malaria on an extensive or even a small scale." Tzaneen (Transvaal) illustrates the urgent need for further research. If the mosquitoes breeding in the river are harmless, the main mass of water within the township will not require control; if, on the other hand, the river mosquitoes are dangerous the malarial problem will be vastly complicated, and it may be beyond the financial resources of the community to control the disease. Investigation often shows that many of the most dangerous-looking places are quite harmless: throughout the whole of the sugar-growing area of Natal there are extensive swamps, but they do not appear to breed dangerous mosquitoes and money spent on draining them would be wasted.

W. F.

WATSON (Malcolm). **Malaria in Rhodesia and South Africa.**—*Jl. Trop. Med. & Hyg.* 1930. Dec. 1. Vol. 33. No. 23. pp. 350-351.

The author writes of the conclusions reached during his visits to Rhodesia and the Union of South Africa. The Rhodesian copper belt, and much of Africa to the south of it, is some 3,500 feet above sea level and it enjoys a cold season when malaria does not spread. Therefore, although within 13 degrees of the Equator, the disease is not severe when compared with what is seen in other parts of the tropics. The carriers are *A. gambiae* and *A. funestus*. Sir Malcolm was particularly interested in the latter, which, with its close allies *A. minimus*, *A. listoni*, *A. varuna*, and *A. aconitus*, is responsible for so much malaria in the East. To such mosquitoes he attributes the abandonment of large areas of Ceylon now covered by jungle which hides ruined cities and extensive irrigation works, witnesses to a former prosperity. In Bengal, too, *A. varuna* must be held responsible for at least some of the malaria which has desolated thousands of acres which were flourishing only fifty years ago. (See League of Nations Report and western Bengal, p. 571 above.) In Africa, the top of a valley often consists of a broad, shallow, catchment area known as a Dambo. These dambos are flooded in the rains; *A. funestus* is found breeding in practically every form of permanent water, and as soon as the rains come it migrates to the dambos. It is found among high grass and in streams shaded by virgin bush. Near the mining towns the dambos are drained, many miles of drains sometimes being required. Within the towns, constructional excavations are filled in; temporary collections of water are oiled. The antimalaria organization has been so successful that the author and his colleagues searched 247 huts within the controlled area without catching a single anopheles, although they were plentiful in the huts outside it. In Natal and Zululand,

work on the sugar estates is sometimes seriously hampered by malaria ; but the actual carriers of the disease are not known and, before work is begun on a large scale, it is essential that they should be identified.

W. F.

STEEL (C. R.). **General Observations arising out of Two Years Work on Malaria in a Lake Port.**—*Kenya & East African Med. Jl.* 1930. Nov. Vol. 7. No. 8. pp. 225-233.

The port and small town of Kigoma are situated on the shore of Lake Tanganyika, at the terminus of the railway from Dar-es-Salaam. There are sandstone hills behind the town, much of which is built on steep gradients. Mosquitoes do not breed in the great lake, which is subject to tremendous storms. *A. gambiae* is the probable carrier. Breeding occurs in streams and drains which become blocked with sand, but in addition there is much "works breeding" connected with scrap, such as old boilers and the like, and railway culverts. *Swarms of larvae are brought into the port in collections of water in barges, and in the life-boats of steamers.* Many houses are mosquito-proofed, but much of the screening is defective even when new. The officials of a Belgian company, who take 8 grains of prophylactic quinine daily, suffer less from malaria than the rest of the Europeans. "Government houses are built very often to a standard plan, set square in a plot and parallel with the front road. This arrangement does not, of course, take into account prevailing winds or the path of the sun, and it often gives rise to ideal mosquito-harbours conditions, breathlessly hot rooms free from air circulation." [Tanganyika is not the only tropical country where this is done.]

W. F.

DE BOER (H. S.). **Anti-Malarial Measures in Towns.**—*Kenya & East African Med. Jl.* 1930. Dec. Vol. 7. No. 9. pp. 256-270. [4 refs.]

The health officer of a town should be responsible for the control of malaria, in the same way as he is responsible for the control of other infectious diseases ; it is wrong to suppose that malaria control needs a special officer. The scattered modern town, with its suburbs and open spaces, is more likely to be malarious than the old town of concentrated buildings, where people lived in their business premises. People cannot be compelled to take quinine, or to use mosquito-nets, or to kill mosquitoes ; anti-larval measures are the best means of malaria-control in towns. The control of all species by abolishing the mosquito pest, is more likely to gain public support than the control of only those mosquitoes which have been found dangerous. Temporary anti-larval measures have been effective in Mombasa, but permanent anti-larval works are preferable. Searchers for adult anophelines in houses and stables are important members of the anti-malaria staff ; they test the efficacy of control measures.

W. F.

PHILIP (C. R.). **Anti-Malarial Measures in Native Reserves.**—*Kenya & East African Med. Jl.* 1931. Jan. Vol. 7. No. 10. pp. 297–307.

In the Digo district of the Coast Province, where the author was stationed, the first step is to improve the condition of the people. A survey showed that one in every five adults, and one in every twenty children, were suffering from pulmonary tuberculosis; about 20 per cent. of the males were infected with urinary schistosomiasis, and pyorrhoea was almost universal. The average haemoglobin value was 66 per cent. in adults and 57 in children; 33 per cent. of the children had less than 50 per cent. and from 70 to 100 per cent. were suffering from ankylostomiasis. The spleen rate was 70 per cent. Considerable improvement followed mass treatment for ankylostomiasis and the institution of latrines; the haemoglobin index increased by about 10 per cent., and the people were better able to grow the food which they required.

W. F.

BROUSSES (A.). Contribution à l'étude du paludisme en région saharienne. Observations recueillies à Djanet au cours de l'épidémie de 1928–1929. [**Malaria in the Sahara. The Epidemic at Djanet in 1928–1929.**]—*Arch. Inst. Pasteur d'Algérie.* 1930. Mar. Vol. 8. No. 1. pp. 77–84. With 1 map in text & 4 figs. on 3 plates. [1 ref.] [Pasteur Inst. of Algeria, Algiers.]

Djanet is a small oasis in the middle of the Sahara with a population of about 1,200 natives and a garrison of 41. From the time of its occupation by the French in 1912, until 1928, there was no indigenous malaria; anophelines do not breed in the wells, there are no streams, and it rarely rains. In January 1928, there was heavy rain which was followed, in May, by a sharp epidemic with 253 cases among the inhabitants and 21 in the garrison. A new anopheline, resembling *A. hispaniola*, was found in the rain-water pools. This new species was named *A. brousse*i by Mr. F. W. EDWARDS, of the British Museum, to commemorate its discovery by the author.

W. F.

SCHWETZ (J.). Le problème de la prophylaxie antipaludique dans les grands centres congolais en général et à Stanleyville en particulier. [**The Problem of Antimalarial Prophylaxis in the Big Centres of the Congo, and in particular at Stanleyville.**]—*Riv. di Malariaologia.* 1930. Sept.–Oct. Vol. 9. No. 5. pp. 609–624. [13 refs.] English summary p. 664.

In Leopoldville 73 per cent. of the children were found to be infected with parasites; in Elizabethville, 45 per cent.; in Stanleyville, 85 per cent. Benign tertian infections are uncommon; in 952 native children in Stanleyville, nearly a quarter of the infections were quartan, the rest were malignant tertian; there was not a single benign tertian infection. The most important carrier is *A. gambiae* (11·5 per cent. infected with sporozoites). Less important carriers are *A. nili* (5·3 per cent. with sporozoites), *A. marshalli* var. *moucheti* (4·5 per cent. with sporozoites), and *A. funestus* (4·2 per cent. with sporozoites). Minor

anti-mosquito measures have proved a complete failure, and the Administration has extensive engineering projects in view with the object of obliterating the breeding places of mosquitoes in the marshes and along the banks of the great river in the three principal towns. The author warns them that the projected works are vast and costly and that it is unlikely that their aims will be realized. In any case it will be long before they can be completed, and in the meantime he advises the suppression of the artificial breeding places due to human activities, and the use of prophylactic quinine.

W. F.

GODOY (A.), LOBO (A.) & CRUZ (Oswaldo), Jr. Sur les anophélinées qui transmettent le paludisme au Brésil. [**Anophelines transmitting Malaria in Brazil.**—*C.R. Soc. Biol.* 1930. Dec. 12. Vol. 105. No. 34. p. 731.]

Dr. Lobo has succeeded in infecting *A. tarsimaculata* with *P. vivax*. Sporozoites were present in the salivary glands. One naturally infected *A. albitalarsis* was found among 200 caught in infected houses.

W. F.

ANANIAN (S.). Données préliminaires sur la parasitologie du paludisme en Arménie. [**Preliminary Note on the Parasitology of Malaria in Armenia.**—*Rev. Microbiol., Epidémiol. et Parasit.* 1930. Vol. 9. No. 2. pp. 231–235. With 1 map in text. [In Russian. French summary pp. 285–286.]

The examination of 35,854 specimens of blood at the tropical disease stations of Armenia, during the three years 1925–7, showed that 50 per cent. of the infections were due to *P. vivax*, 20 to 45 per cent. to *P. malariae*, and 10 to 15 per cent. to *P. falciparum*. *P. falciparum* is more common in the mountainous parts. The predominant anopheline is *A. maculipennis*, but, in addition, *A. pseudopictus*, Grassi, is common in the plains, and *A. superpictus*, Grassi, in the mountains.

W. F.

SCHILLING (Claus). Neuere Gesichtspunkte für die Bekämpfung der Malaria, besonders in Italien. [**Recent Views on Antimalarial Measures, particularly in Italy.**—*Med. Klin.* 1930. Nov. 14. Vol. 26. No. 46 (1353). pp. 1697–1698. With 1 text fig. [Robert Koch Inst., Berlin.]

With the help of a diagram the author recalls the basic principles of antimalarial measures. It appears that the early antimalarial experiments in the Campagna and Pontine marshes failed because the land recovered by drainage was not immediately intensively cultivated and planted with crops; also the cattle should have been placed in stalls. In the planning of a colony in Maccarese, in the neighbourhood of Rome, the cattle stalls were brought under the same roof as the dwellings, but only the latter were protected with wire gauze. The cattle were not allowed in the fields. It may be accepted that in this way "zoophilic" strains of anopheles were bred up. The agricultural advantages (milk, crops) were apparent, but a large capital was required, 20 million lira for the Maccarese scheme alone. The population of Maccarese increased from 200 to 2,800. The malarial morbidity in

1924 was about 880 per mille, in 1928 about 110 per mille. In the whole Campagna the morbidity for 1928 alone was over 34 per cent. This "bonification," carried out by a systematic cooperation of practical scientific workers, gives the impression that such a combination is certainly of value.

E. D. W. Greig.

MARCHIAFAVA (Ettore). **Pernicious Malaria.**—*Amer. Jl. Hyg.* 1931. Jan. Vol. 13. No. 1. pp. 1-56. With 3 text figs. [18 refs.] [Experim. Station, Anti-Malaria Campaign, Rome.]

It would be almost sacrilegious to attempt to summarize the professor's monograph. It contains so much that is of value, drawn from his great store of knowledge and experience, that it should be read in the original. He states that his object is to present to medical practitioners the fundamental notions about pernicious malaria, and that much of what is set forth is to be found in the "Trattato sulla Malaria" published by BIGNAMI and himself in 1902.

W. F.

MANALANG (C.). **Does the Amount of Malaria depend on the Number of Transmitting Mosquitoes?**—*Jl. Trop. Med. & Hyg.* 1931. Jan. 15. Vol. 34. No. 2. pp. 19-27. [13 refs.]

The importance of the number of anophelines in a district can only be determined if surveys are made before and after, as well as during, an outbreak of malaria. The number of mosquitoes caught in houses is not a good measure of mosquito density. HACKETT could find no *A. funestus* (*minimus*) in Philippine houses, during a seven-day visit, though many were being caught in traps. The number to which anopheles must be reduced in order to diminish malaria differs at different times and in different places; this accounts for the varying results of measures for mosquito control. The systematic examination of mosquitoes for sporozoites gives more valuable information than the mere enumeration of the transmitting species. "Mosquito density in a locality at a given period is of importance only when the infective number in the same locality during that period is known."

W. F.

SINTON (J. A.), HARBHAGWAN & SINGH (Jaswant). **The Numerical Prevalence of Parasites in Relation to Fever in Chronic Benign Tertian Malaria.**—*Indian Jl. Med. Res.* 1931. Jan. Vol. 18. No. 3. pp. 871-879. With 1 chart in text. [16 refs.]

Observations on young soldiers at Kasauli, who were suffering from chronic benign tertian malaria, showed that pyrexia began when the number of parasites reached about 5,000 per cmm. (the pyrogenic threshold). In early cases, the pyrogenic threshold is only about 200-500. The higher threshold observed in chronic infections suggests the development of tolerance.

W. F.

KNOWLES (R.) & GUPTA (B. M. Das). **Clinical Studies in Malaria by Cultural and Enumerative Methods.**—*Indian Med. Gaz.* 1931. Jan. Vol. 66. No. 1. pp. 1-11. With 5 coloured figs. on 1 plate. [20 refs.]

Fifteen cases of malaria were kept untreated as long as possible, in order to study the mechanism of spontaneous cure. Almost all of them were suffering from chronic infections. The authors conclude that there is a definite tendency towards spontaneous cure in malignant tertian infections, but that in benign tertian the tendency is in the opposite direction, namely towards chronic disease and relapses. In one case of malignant tertian, a polymorphonuclear leucocyte and a large hyaline leucocyte were each seen containing an ingested schizont and this is considered to have an important bearing on the question of spontaneous cure. Crescents are more numerous during September than during July and August, in Bengal. In convalescent cases of malignant tertian, quinine increases the number of crescents. [Russell AMIES, see p. 597 below, does not agree with this.] In one case, after crescents had persisted 41 days, in spite of quinine, they were got rid of by plasmoquine in two days. Tests of the urine with Mayer's reagent showed that the Government cinchona febrifuge tablets were too hard and were not absorbed. [The evidence is not quite convincing.] SINTON'S standard treatment was found too complicated and too drastic. The authors suggest 10 grains of quinine twice a day with alkalis, for 10 days, and 0.01 gram of plasmoquine daily for the last six days. "The final test for cure should be that a Bass culture, taken with 5 cc. of the patient's blood after all alkaloids have been eliminated as tested in the urine, should remain sterile." [But this would not mean that the patient was permanently cured.] A coloured plate is given, but it is not easy to find out to what the figures refer. The authors state that cinchonine is particularly toxic [which is contrary to the finding of most investigators] and that Indian cinchona febrifuge contains less of this alkaloid than the Java febrifuge. They also recommend that the urine should be collected over the twenty-four hours and tested with Mayer's reagent, to make certain that the quinine is being absorbed. [It is preferable, for several reasons, to test freshly passed samples twice a day.]

W. F.

LADYJENSKI (P. M.). **[Malaria in Children in the Dniestr Region.]**—*Trop. Med. & Veterin.* Moscow. 1930. Vol. 8. No. 1. pp. 1-4. [9 refs.] [In Russian.]

In the districts adjoining the river Dniestr, in Russia, where malaria is endemic, 41.7 per cent. of cases observed were children up to the age of fifteen. Cases of benign tertian were predominant (343), malignant tertian (47) and quartan (2) being of secondary importance. The clinical course of the disease in children was atypical, the attacks in the majority of cases being quotidian and a high temperature (minimum 38°-37.5° C.) being maintained even between the attacks. In eight cases the author made observations on infants born from infected mothers. In all these blood was taken from the mother, from the placenta and from the new-born infant, with the following results:—

Nos.	Mother.	Placenta.	Child.
1.	<i>P. falciparum</i> .	Nil.	<i>P. falciparum</i> .
4.	"	Nil.	Nil.
5.	"	<i>P. falciparum</i> .	<i>P. falciparum</i> .
7.	"	"	"
8.	"	"	"
2.	<i>P. vivax</i> .	<i>P. vivax</i> .	<i>P. vivax</i> .
3.	"	Nil.	Nil.
6.	"	<i>P. vivax</i> .	<i>P. vivax</i> .

The author holds that the infection is transmitted from parent to foetus only when the placenta is damaged and that in the temporary absence of parasites from the circulation of the mother (during treatment) infection of the offspring can be prevented.

[See also WISLOCKI, p. 593, below.]

C. A. Hoare.

ZIEMANN (Hans). Beitrag zur Frage der sogenannten Kriegsmalaria. (**A Contribution to the Problem of the So-called "War-Malaria."**)—*Riv. di Malariologia*. 1930. May-June. Vol. 9. No. 3. pp. 261-270. French summary. English summary (6 lines) p. 360.

This is a paper contributed to the International Malarial Congress at Algiers in 1930. As regards the latent period of malaria there is an undoubted possibility of its extending to 10 years, but 5 years after infection the attacks become always slighter, and, for practical purposes, may be regarded as ceasing after 7-8 years. In practice it is only malignant tertian infections which produce permanent organic changes in the organs [GIGLIOLI, working in British Guiana, states that "in cases of malignant tertian the danger of chronic nephritis need not be considered."]. The author considers that no causal connexion between malaria and pernicious anaemia, leukaemia, and some other morbid conditions has been established.

E. D. W. Greig.

HEINEMANN (H.). Zur Frage des Einflusses der Malaria auf den Widerstand des Organismus bei Tuberkulose. [**Effect of Malaria on the Resistance of the Body to Tuberculosis.**—*Deut. Med. Woch.* 1930. Dec. 26. Vol. 56. No. 52. pp. 2213-2214. [6 refs.]

The author deals with the contribution of KYRIASIDIS on this subject [*ante*, p. 118]. He agrees with Kyriasidis that epidemiologically there is no evidence that malaria paves the way for tuberculosis, and that opsonin estimation is valuable for measuring the power of malaria to produce resistance to tuberculosis. However, he parts company with him on the question of the value of the von Pirquet reaction as an indicator of the resistance of the malaria infected patient to tuberculosis.

E. D. W. Greig.

KLIGLER (I. J.) & MER (G.). **Studies on Malaria: VI. Long-Range Dispersion of Anopheles during the Prehibernating Period.**—*Riv. di Malariologia*. 1930. July-Aug. Vol. 9. No. 4. pp. 363-374. With 2 charts & 4 figs. in text. [6 refs.] [Hyg. Dept., Hebrew Univ., Jerusalem.]

Mosquitoes, *A. elutus*, were caught in tents, houses, and stables at Melaha, close to the swamp where they breed; at Ayeleth, a small

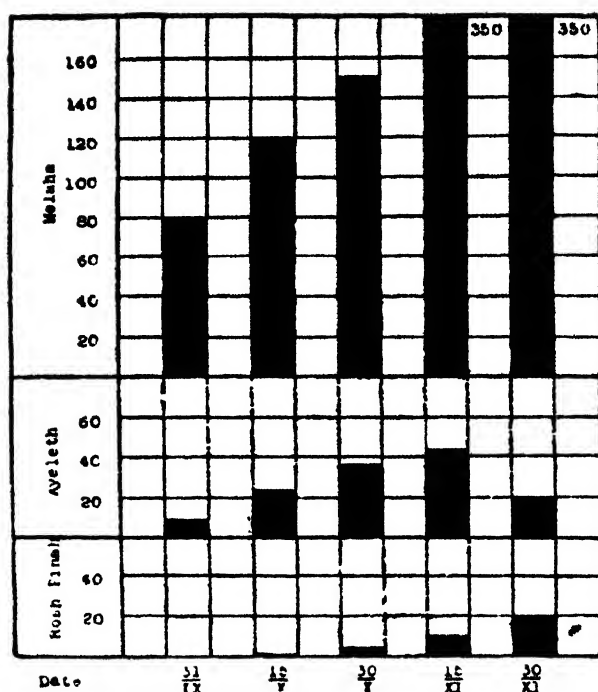


Chart 1. Relative concentration of *A. elutus* at Melaha in the marsh area, at Ayeleth in the plain 3 miles off, and at Rosh Pinah a large hill settlement $6\frac{1}{2}$ miles from the breeding place, computed from their observed density in fixed catching stations during the migration period.

[Block kindly supplied by the *Rivista di Malarologia*.]

settlement in the plain 3 miles away; and at Rosh Pinah, a large settlement in the hills, $6\frac{1}{2}$ miles from the breeding ground. The chart indicates the results. Epidemics occur at Rosh Pinah, in the late autumn, due to the long distance dispersion of anopheles from the marsh during the pre-hibernating period. They feed during the stages of their flight and arrive infected. The incidence of infected mosquitoes (2.8 per cent.) at Rosh Pinah, where there are very few gametocyte-carriers, was almost as high as at Melaha (3.5 per cent.) near the swamp. In the mosquitoes destined for hibernation, blood-feeds lead to deposition of fat, instead of to development of the ovaries, and the abdomen becomes distended and cylindrical. They are born without fat and only accumulate it slowly after a number of feeds. The degree of fat and the incidence of fat-containing females may serve as a gauge of the distance of a place from the breeding-place. The incidence of fat-containing *A. elutus* at Rosh Pinah was greater than at Ayeleth; at Ayeleth it was greater than at Melaha. About 4 blood meals are required for maximum fat deposit. The life of these hibernating mosquitoes is relatively long, and it is apparently the females, destined for hibernation, which make the long flights.

W. F.

DE BUEN (Sadi). Algunas consideraciones sobre la conservacion del virus paludico en la epoca interepidemica. [**The Conservation of Malaria Virus in Interepidemic Periods.**—*Medicina Paisés Cálidos*. Madrid. 1931. Jan. Vol. 4. No. 1. pp. 19–23. French summary (6 lines). [Antimalaria Inst., Navalmoral de la Mata, Cáceres, Spain.]

In Navalmoral and Talayuela the first brood of mosquitoes generally emerges in the first half of April ; hence patients suffering from malaria in the first four months of the year cannot have acquired infection from the mosquitoes of the same year, and it is quite exceptional to find that the few mosquitoes present in the houses during the cold months will bite man. Hence, the cases which are met with during the early part of the year are either relapses or instances of prolonged incubation. The author studied 237 patients and 159 (67·5 per cent.) of them gave a history of malarial attacks in the previous year, while 78 (32·5 per cent.) gave none, that is suffered from an attack at a time when transmission was practically zero. More detailed analysis of 183 patients (150 children under 9 years and 33 adults) showed that 115 had had attacks the year before, 68 had not. During the winter months it is very rare to find parasites (*P. vivax*) in the blood of children ; in fact, only 3 were positive out of 801 examined (0·37 per cent.). From the figures given in a table the number of adult patients with the parasite in their blood was relatively more than double that of children—69·3 as compared with 30·0 per cent. [but the number of adults was, as stated above, only 33]. In another table figures show that children in the first 9 years of life (as judged by comparatively small numbers) are 5 times as receptive (2·7 attacks per patient) as adults (0·5–0·47 attacks). The author concludes that :

(a) Cases of benign tertian with prolonged incubation are of great epidemiological importance. (b) Such are more frequent in adults than in children, owing to the lower receptivity of the former [and consequently longer incubation period]. (c) In the district dealt with relapses in children account for more attacks in the early months of the year.

H. H. S.

KORTEWEG (P. C.). Waardoor wordt het koortsbeloop bij primaire malaria tertiana beheerscht ? Wat is het normale beloop : tertiaan of quotidiaan ? [**What governs the Temperature in Primary Tertian Malaria ? What is the Normal Course : Tertian or Quotidian ?**—*Nederl. Tijdschr. v. Geneesk.* 1931. Apr. 4. 75th Year. 1st Half. No. 14. pp. 1750–1763. With 2 figs. [11 refs.] [Inst. for Trop. Hyg., Wilhelmina Hosp., & Psychiat.-Neurol. Clinic, Amsterdam.]

The answer to the last question, as given in text books, is universally tertian, with the explanation of a double infection to account for quotidian symptoms. But, as a result of the use of malaria infection for the treatment especially of dementia paralytica, doubt has arisen of the correctness of this answer. The author in many years' experience of country practice formed the impression that in the majority of cases first attacks of malaria exhibit tertian characters to begin with and later, with the development of a second generation of plasmodia, tend to become double tertian, that is to say quotidian. In the application of malaria therapy two methods are employed, direct inoculation of

blood from case to case and transmission by malaria infected mosquitoes. In 236 cases with inoculation of malarial blood a tertian fever developed and continued as such in 57. In 61 cases the fever was tertian to begin with and became quotidian later. Eighty cases were purely quotidian and 38 cases were of irregular character. This leads the author to the pronouncement that tertian malaria shows a tendency to become quotidian; quotidian on the contrary shows little tendency in its continued course to become tertian. In Amsterdam the malaria infection is, as a rule, brought to an end by means of neosalvarsan followed later by quinine. The parasites seldom disappear entirely under neosalvarsan and during this the patients can be and are used as donors for further inoculations.

It was the application of the infected mosquito method of inoculation, however, which led JAMES in England to question the correctness of the term "tertian" as truly descriptive. His experience showed that the primary tertian malaria attack in 80 per cent. of cases did not exhibit a tertian but a quotidian fever and this whether the patient was bitten only once by one mosquito or by several mosquitoes at different times. In his cases the transition was from quotidian to tertian and not the reverse. In Amsterdam the number of cases of mosquito infection was not large. Care was taken also that an interval of 48 hours should elapse between bites, seeing that an interval of 24 hours is more likely to give rise immediately to the development of two generations of parasites. Of the 38 cases analysed 20 showed pure tertian symptoms from beginning to end; 10 began as tertian and later became quotidian, while 8 were purely quotidian. These results are the reverse of those obtained by JAMES and the author here reaffirms his statement made with regard to malaria produced by direct blood infection:—Tertian malaria shows a tendency to become quotidian in regard to its temperature curve; quotidian on the contrary shows little tendency in its continued course to become tertian. Can the difference, he asks, between the results obtained in England and Holland be due to a different strain of parasite? The former was obtained originally from Madagascar, the latter from the neighbourhood of Amsterdam. The two sets of trials show some differences in incubation time for the development of the malaria attack.

W. F. Harvey.

SERGEANT (Edm.), SERGEANT (Et.) & CATANEI (A.). Paludisme des oiseaux. Une question de nomenclature. Le nom de *Plasmodium praecox* doit-il désigner un parasite du paludisme humain ou un parasite du paludisme aviaire? [**Should the Name *Plasmodium praecox* be applied to a Malarial Parasite of Man or of Birds?**]*—Arch. Inst. Pasteur d'Algérie.* 1929. Sept.-Dec. Vol. 7. No. 3-4. pp. 223-238. With 1 text fig. [10 refs.] [Pasteur Inst. of Algeria, Algiers.]

The names *Plasmodium praecox* and *Plasmodium relictum* are both used to describe the same parasite of birds, namely that with which Ross did his classical experiments. In 1890, GRASSI and FELETTI thought that the parasite of bird malaria and the one associated with quotidian fever in man were identical, and they called them *Plasmodium praecox*. Subsequently, they found that they were dealing with two distinct species, and, in January 1891, they gave the name *P. relictum* to the bird parasite and retained the name *P. praecox* for the human parasite. The authors therefore conclude that *P. praecox* is the correct name for the human parasite. Prof. C. W. STILES, however, disagrees with them: he argues, from one

of GRASSI and FELETTI's notes, that they first gave the name to an avian parasite, and later extended it to the human parasite, which they thought—but were never quite sure—was the same. The host type is therefore a bird, according to STILES, and the name *P. praecox* should be reserved for the avian parasite.

W. F.

CASTELLANI (Aldo). **Malaria simulating Various Other Diseases including Certain Surgical Conditions.**—*Jl. Trop. Med. & Hyg.* 1930. Dec. 1. Vol. 38. No. 23. pp. 357–364. With 3 charts in text. [14 refs.]

The object of this paper is to call the attention of medical men practising in non-malarious countries to those atypical clinical manifestations which are important from a practical point of view, and which occasionally occur in patients who have returned to England from the tropics. Numerous cases, drawn from the author's wide experience, illustrate how malaria can mimic other diseases. Pseudo-appendicitis due to malaria is well known; cases resembling cholecystitis, acute haemorrhagic pancreatitis, general peritonitis, and abscess of the liver are also described. With regard to the last disease, it is said—and all will agree—that mistaking abscess of the liver for malaria is a far more common error than mistaking malaria for an abscess. Sometimes malaria causes symptoms like those of dysentery or cholera, and the story is told of a patient who was about to be removed to an infectious diseases hospital, with a diagnosis of cholera, when an examination of the blood revealed the true nature of his illness, which was cured in a couple of days with quinine. In 1915, the author investigated an outbreak of so-called scurvy in a Serbian regiment. The symptoms were petechiae, subcutaneous extravasations, bleeding gums and haemorrhages from the orifices of the body. All improved in a remarkable manner on quinine. Hemiplegias, monoplegias, and peripheral neuritis may be caused by malaria, and the author has seen a case of clinically typical transverse myelitis, due to malaria, and three cases closely resembling disseminated sclerosis. He has also seen two cases of apparent mania, and one of apparent melancholia, cured by quinine. Malarial psychoses may have great importance from a medico-legal point of view.

W. F.

WISLOCKI (George B.). **Observations on the Placenta from a Case of Malaria.**—*Bull. Johns Hopkins Hosp.* 1930. Sept. Vol. 47. No. 3. pp. 157–163. [1 ref.] [Anat. Dept., Johns Hopkins Univ., Baltimore.]

“The villi, including their stroma and covering chorionic syncytium, were anatomically normal and not visibly affected by the malarial organisms or their products. It is unlikely that malarial organisms can enter or penetrate the chorionic syncytium, so that the transmission of malaria from mother to foetus occurs rarely, if at all.” The author reached this conclusion from the histological examination of the placenta of a woman admitted to hospital with (? subtertian) malaria. She received 5 hypodermic injections of quinine ($7\frac{1}{2}$ grains each) in the $2\frac{1}{2}$ days prior to her delivery, and, when this took place, no parasites were found in films of her peripheral blood. The placental blood, on the other hand, contained many segmenting and presegmenting forms; from which it is concluded

that malaria parasites in the placenta are immune to damage by quinine. The malarial pigment was taken up by monocytes. Though this pigment is very finely divided, no trace of it could be found either in the chorionic syncytium or in the underlying foetal stroma protected by this impermeable structure. [See this *Bulletin*, Vol. 26, p. 11, & Vol. 23, p. 130.]

W. F.

MÜHLENS (P.). Ueber Malariatodesfälle bei Seeleuten insbesondere zwei Fälle von Malariaenzephalitis. [**Two Cases of Malarial Encephalitis in Seamen.**—*Deut. Med. Woch.* 1931. Mar. 13. Vol. 57. No. 11. pp. 440-443. [1 ref.] [Inst. for Ship & Trop. Diseases, Hamburg.]

The author describes two cases of haemorrhagic encephalitis caused by malignant tertian malaria in seamen who had returned from the West Coast of Africa. He strongly recommends for seamen on ships trading to the West Coast of Africa a combined quinine and plasmochin prophylaxis, which should be continued until the ship returns to the home port and indeed for 8-14 days longer.

E. D. W. Greig.

SKLIAR (N.) & RJABOWA (M.). Ueber Malariapsychosen. [**Malarial Psychoses.**—*Monatsch. f. Psychiat. u. Neurol.* 1931. Jan. Vol. 78. No. 1. pp. 1-29. [14 refs.]

Professor Skliar for the last 6½ years has been stationed in Astrakhan, where malaria is almost endemic. He and Dr. Marie Rjabowa studied 75 cases of psychoses, 49 males and 26 females. They give a full account of the cases. A particular problem which they wished to solve was whether or not there is a specific malarial psychosis. They concluded that such a mental disturbance as could be differentiated from psychoses caused by other infectious diseases did not occur, although there were some differences in details which might be ascribed to the malaria. [No details are given regarding the blood examination of the cases of malaria.]

E. D. W. Greig.

MELNOTTE (P.). Contribution à l'étude des atteintes rénales au cours du paludisme. [**Kidney Disease in Malaria.**—*Bull. Soc. Path. Exot.* 1930. Nov. 12. Vol. 23. No. 9. pp. 958-966. [14 refs.] [Milit. Hosp., Strasbourg.]

The author has found a transient albuminuria, during the attack of fever, in one-third of his cases. The rarity of chronic nephritis he attributes to quinine treatment. Casts were found in 10 per cent. of the patients with albuminuria. Uraemia is common in pernicious malaria, and is due to a lowering of the chlorides in the blood. The main conclusion is that the renal manifestations are usually secondary to lesions in the liver. (See also GIGLIOLI, *ante*, p. 131.)

W. F.

BOSCH (W. G.). Een geval van quartana-nephrose. [**A Case of Quartan Fever Nephrosis.**—*Geneesk. Tijdschr. v. Nederl.-Indië.* 1930. Nov. 1. Vol. 70. No. 11. pp. 1101-1104. [4 refs.] [Catharina Hosp., Dutch American Plantation Co., Kisaran.]

A case of quartan fever combined with acute nephrosis in a Javanese girl of 4½ is described in some detail. The hydrops disappeared completely and only a trace of albumin was found in the urine 3 months after the

onset of the disease. Apart from the clinical course of this case the relatively frequent concurrence of nephrosis and quartan fever, the rarest type of malaria, suggests an aetiological connexion, which has already been noticed by LAVERAN, and certainly deserves further attention.*

W. J. Bais.

MONTELEONE (Remo). La riattivazione della malaria latente con il CaCl_2 . (**Calcium Chloride as a Provocative in the Diagnosis of Latent Malaria.**)—*Riv. di Malariologia*. 1930. May-June. Vol. 9. No. 3. pp. 257-260. English summary (4 lines) p. 360.

When patients present themselves with a history pointing to recent malaria but with temperature normal and no parasites in the blood, the author administers an intravenous injection daily of 10 cc. of a 10 per cent. solution of CaCl_2 . On the second or third day the temperature rises and examination of the blood reveals parasites. He gives brief notes of four such cases.

H. H. S.

GUPTA (B. M. Das). **A Fatal Case of Malaria in a Diabetic Subject.**—*Indian Med. Gaz.* 1931. Jan. Vol. 66. No. 1. pp. 20-21. With 1 coloured plate. [7 refs.]

Blood-inhabiting protozoa require sugar for their nutrition. Dextrose is necessary for the cultivation of malaria parasites *in vitro*, but they can be cultivated in diabetic blood without further addition. Trypanosomes use up blood sugar, and death in experimental animals may occur in a condition of acute hypoglycaemia. In a case of chronic, afebrile, malignant tertian malaria, formerly under the author's care, a large dose of glucose regularly produced an increase of parasites and a febrile relapse.

The patient to whom this paper refers was under treatment for diabetes and contracted subtertian malaria after his blood sugar had been brought down to normal. Coma supervened and he died. Twelve hours before death the blood sugar was only 0.0714 per cent. A coloured plate is given showing the large schizonts in the peripheral blood, which are characteristic of these fulminating cases. [The duration of the malaria is not stated. It is not clear that there was any abnormal quantity of sugar in the blood at the time of the attack.]

W. F.

SHIHA (M. M.). **Discussion on Malarial Dysentery.**—*Jl. Egyptian Med. Assoc.* 1930. Dec. Vol. 13. No. 12. pp. 586-589. [4 refs.]

This paper deals with the causation of the dysentery which occurred in a number of heroin addicts infected with malaria, and which Dr. ARAFA attributed to malaria (see this *Bulletin*, 1930, Vol. 27, p. 657). The author has had experience of heroin addicts who took the drug by snuffing it up the nose; they were consequently free from the syringe-carried malaria which affected ARAFA's cases, yet they suffered equally from dysentery. It is argued from this that stopping the heroin on admission to hospital was probably the true cause of the gastro-intestinal symptoms, in both series.

W. F.

* See also this *Bulletin*, Vol. 27, GIGLIOLI, p. 509, and GOLDIE, p. 351.

TAMALET (E.). Paludisme et lithiase biliaire. (**Malaria and Cholelithiasis.**)
—*Riv. di Malariologia*. 1930. July-Aug. Vol. 9. No. 4. pp. 388-399. [17 refs.] English summary (5 lines) p. 477.

Out of 1,120 old malaria cases the author found 8-9 per cent. suffering from gall-stones. He considers cholelithiasis to be a complication of malaria, due to haemolysis, hypercholesterinaemia, repletion of the liver, etc., which cause a disturbance in the colloidal equilibrium of the bile; thus calculi, which have a nucleus of bile pigment and concentric layers of cholesterin, are formed.

[TIDY gives the frequency of gall-stones, in all autopsies, as 5 to 12 per cent.]

W. F.

SINTON (J. A.). **A Suggested Standard Treatment of Malaria based upon the Results of the Controlled Investigation of over 3,700 Cases.**—*Indian Med. Gaz.* 1930. Nov. Vol. 65. No. 11. pp. 603-620. [30 refs.]

During the past nine years the Indian Research Fund Association has financed a quinine and malaria inquiry. The British patients were adult soldiers, and the Indians were adult prisoners in the Lahore Central Jail. The British cases were nearly all very chronic; many of the Indian cases were fresh infections. During the whole course of the investigations, no case of quinine resistance was encountered. Though the parasites seemed to persist longer in fresh than in chronic infections, there were more relapses after treatment in the chronic cases, and they were more difficult to cure. Among 1,401 cases of malignant tertian under quinine treatment, the fever lasted more than 5 days in only 7 instances, and the maximum was 6 days. Among 1,846 cases of benign tertian, only 18 had fever for more than 3 days, and none for more than 4½ days. The reason why some workers have succeeded with intramuscular injections, in cases where they have failed with oral quinine, is that they have not taken precautions to ensure that the oral quinine was swallowed and absorbed. For intramuscular injections "there seems only one indication, and that is in those very rare comatose cases, usually children, where oral administration, or intravenous injections, are found impossible." Citric acid, which is absorbed into the body as an alkali, is to be preferred to mineral acids as a solvent for the cinchona alkaloids, in order to avoid increasing the acidosis associated with malarial attacks. Where there is vomiting, the oral administration of 20 minims of adrenalin solution (1 in 1,000) has never failed to permit the use of the alkaloids by the mouth. Though prolonged courses of treatment give a slightly higher rate of permanent cures, the difference is not sufficient to warrant the extra time and expense. As regards plasmoquine, it is probable that a daily dose as low as 0.04 gram is excessive for routine treatment; it should always be given under medical supervision. It has little or no action in malignant tertian malaria, except upon the crescents.

The suggested routine treatment is as follows: In severe cases specific treatment should be begun without delay, but, in the ordinary case, give 3 grains of calomel followed by one ounce of magnesium sulphate dissolved in warm water. Two mixtures are used:—

<i>Mist. A.</i>			<i>Mist. Q.</i>		
Sod. bicarb.	grains	60	Quin. sulph.	grains	10
Sod. citrat.	grains	40	Citric. acid	grains	30
Calc. carb.	grains	3	Mag. sulph.	grains	60
Water to	ounce	1	Water to	ounce	1

(Cinchona febrifuge may be used instead of quinine.)

After the preliminary purge has acted, *Mist. A.* is given hourly for 3 hours. Half an hour after the third dose, *Mist. Q.* is given. Thereafter, the mixtures are given three times a day for a week, the alkaline mixture being given half an hour before the quinine mixture. In addition, plasmoquine 0.015 gram is given, once daily after food, throughout the week of treatment. If a relapse occurs, the treatment is repeated for one week, and continued for a second, with two doses instead of three and no plasmoquine, in malignant tertian cases. In benign tertian, the daily dose of plasmoquine may be raised to 0.02 gram during the 14-day course. In chronic relapsing infections, the three daily doses of *Mist. A.* and *Mist. Q.* are given during the first week, followed by two weeks on two daily doses, and a total daily dosage of 0.03 to 0.04 gram of plasmoquine is given in two divided doses after meals. "If this treatment is strictly carried out, not more than 1 per cent. of the original cases should remain infected, and these should be cured by another course." [But we fear that it is too complicated to be strictly carried out. It is difficult enough to get patients to take a simple ten grains of quinine twice a day. Before prescribing the treatment the medical man should take a course himself, remembering that these doses are supposed to be suitable for Indians and increasing them in proportion to his weight.]

W. F.

AMIES (C. Russell). **The Effect of Quinine on the Production of Gametocytes in Subtertian Malaria.**—*Bull. Inst. Med. Res. Federated Malay States.* 1930. No. 2. 10 pp. With 1 chart. [11 refs.]

It has often been suggested that though quinine destroys the trophozoites of subtertian malaria it nevertheless causes an increase in the number of crescents. GREEN (see this *Bulletin*, 1929, Vol. 26, p. 931) found crescents in 64 per cent. of 250 patients at the end of a week's treatment, whereas they were present in only 50 per cent. at the beginning. ROSS and THOMSON, on the contrary, believe that quinine does not increase the numbers of gametocytes. In order to investigate this question, the author administered 30 grains of quinine daily to 40 patients with crescents in their blood, and to a similar control group of 40 patients he gave nothing but a diaphoretic mixture. The crescents were counted daily, in thick films, by Sinton's fowl-corpuscle method. A comparison of the results showed that the production of gametocytes was not influenced by the quinine. A third series, comprising 35 patients, was given quinine after a short course of diaphoretic mixture, and "the results obtained afforded further evidence that quinine has no direct effect upon crescent production." The author believes, with ROSS and THOMSON, that the crescent count on any given day depends upon the number of asexual parasites present 5 to 10 days before, irrespective of any quinine given subsequently. Crescents appear on about the 5th day of the attack and reach their maximum about 5 days

later ; it therefore follows that a higher percentage will have crescents after 7 days in hospital, either with or without quinine.

W. F.

HUGHES (T. A.) & SHRIVASTAVA (D. L.). **Studies on the Enlarged Malarial Spleen. Part III. Further Observations on the Effects of Quinine and Alkalis on the Blood Picture, together with Some Remarks on the Nature of the Enlarged Malarial Spleen. Part IV. Effect of Oral Administration of Plasmoquine on the Blood Picture.**—*Indian Jl. Med. Res.* 1930. Oct. Vol. 18. No. 2. pp. 501–509. With 1 text fig. [6 refs.]; pp. 511–515. [1 ref.] [King Edward Med. College, Lahore.]

Oral quinine causes a transient leucocytosis due to splenic contraction. This effect is enhanced by the administration of sufficient alkalis to render the urine alkaline. There is no evidence of increased cell proliferation, and the white cell count falls to about the original level after three or four days. The effect of adrenalin is increased in the same way by alkalis. Intravenous quinine appears to produce a maximal contraction of the spleen and therefore the simultaneous administration of alkalis produces no increased leucocytosis. When the spleen is fibrous the leucocytic response to both adrenalin and quinine is greatly diminished. The enlargement of the spleen in malaria is an immunity reaction due to proliferation of the reticulo-endothelial cells.

W. F.

SINTON (J. A.). **Studies in Malaria, with Special Reference to Treatment. Part XIV. The Effects of Dosage of Drugs and Duration of Treatment on the Production of Cure. Part XV. Does the Strain of Parasite Influence Cure? Part XVI. The Relationship of Season to Cure Rate.**—*Indian Jl. Med. Res.* 1931. Jan. Vol. 18. No. 3. pp. 831–844. [47 refs.]; pp. 845–853. [36 refs.]; pp. 855–869. With 1 chart. [2 pages of refs.]

Part XIV. The author concludes from the reports of others, and from his own experience, that 20 grains of quinine daily is the minimal dosage during an acute attack of benign tertian, but that in the acute stages of malignant tertian and quartan malaria at least 30 grains daily “seems” to be the minimal daily dosage for routine use. [From a footnote it appears that these figures refer to the treatment of Europeans weighing about 10 stones, and not to the lighter Asiatics. In regard to permanent cure “it would seem that, within certain limits, the dosage is of less importance than the duration of the treatment”; but one week of treatment will cure a very large percentage, and one does not seem justified in subjecting patients to the discomfort and expense of very prolonged courses.]

Part XV. No certain proof has been brought forward that different strains of malaria parasites possess different degrees of virulence, or that the virulence of a strain can be changed by passage through certain species of mosquitoes or through human hosts with different degrees of susceptibility. Nevertheless the evidence, in the case of *P. vivax* at least, supports the view that malaria parasites vary in virulence.

Part XVI. There appears to be a seasonal incidence in relapses, and the evidence suggests that the relapse rates may be correlated to atmospheric temperature.

W. F.

KLIGLER (I. J.) & MER (G.). **Studies on Malaria: V. Therapeutic Value of Mixtures of Plasmoquin and Quinine.**—*Riv. di Malarologia*. 1930. May-June. Vol. 9. No. 3. pp. 272-283. [8 refs.]

Five-day courses of three plasmoquine and quinine tablets were given to over 1,000 people. Each tablet contained 0.1 gram of plasmoquine and 5 grains of quinine; smaller doses were given to children. The treatment was carried out by orderlies under the supervision of the authors, who estimate that about 75 per cent. of the adult villagers received the full course. Whereas some 29 per cent. were infected with parasites before treatment, this figure was reduced to 7, at its conclusion, but about a fortnight later the percentage of infection was as high as it was before treatment, and the authors conclude that "mass treatment in an infected region at the time when infected mosquitoes are already about, is entirely ineffectual in so far as checking, or controlling the disease is concerned." (See CLEMESHA, above, p. 576.)

W. F.

SERGEANT (Etienne) & CATANEI (A.). **Résultats du traitement d'enfants indigènes paludéens par la plasmoquine, en Algérie.** [**The Treatment of Native Children in Algeria with Plasmoquine.**]—*Arch. Inst. Pasteur d'Algérie*. 1930. Mar. Vol. 8. No. 1. pp. 71-76. With 2 diagrams. [Pasteur Inst. of Algeria, Algiers.]

Nine native children 6 to 12 years old, who were suffering from malignant tertian malaria, were given daily doses of 0.04 to 0.08 gram of plasmoquine, for one week, and for 3 days of each of the following 5 weeks. Only one child showed signs of intolerance. The treatment did not get rid of the schizonts and, in two cases, it had no action upon the gametocytes. [In view of the persistence of the gametocytes in these two cases, and the absence of toxic symptoms in all but one of the children, in spite of the large doses, one wonders if the tablets, "administered by a trustworthy agent," were always swallowed by the children.]

W. F.

AMIES (C. Russell). **The Use of Plasmoquine in Subtertian Malaria.**—*Bull. Inst. Med. Res. Federated Malay States*. 1930. No. 5. 37 pp. [24 refs.]

Preliminary observations were made by feeding anophelines daily on crescent carriers in order to determine if the patients were good infectors. Plasmoquine was then given in doses of 0.02 gram twice a day; a batch of mosquitoes was fed on each patient daily, two hours after the morning dose, and the crescents in the blood were counted at the same time. The results were as follows: patients Nos. 1 and 2 infected mosquitoes on each of three days before the administration of plasmoquine, but they did not infect any of those which bit them

two hours after the first dose, or on the next three days. Patient No. 3 infected mosquitoes on two days out of three during the preliminary period, but failed to infect two hours after the first dose of plasmoquine, and on six subsequent days. Patient No. 4 infected mosquitoes on one day out of four before plasmoquine was given, but he infected none afterwards. Patient No. 5 absconded. Patients Nos. 6 and 7 were given only one day's plasmoquine treatment. No. 6 infected mosquitoes on one day out of two before its administration, but not during five subsequent days. No. 7 infected mosquitoes on each of the two preliminary days, and also infected the batch which fed on him two hours after the first dose, but he did not infect during the next three days. Patients Nos. 8 and 9 were given plasmoquine treatment every fourth day. No. 8 was infective on two days out of three before treatment, but not on any of the eight days following the first dose. Patient No. 9 was the most striking case; he infected mosquitoes on each of four days before treatment, but not on any of seven days of subsequent observation. Two control cases, Nos. 10 and 11, were treated with quinine. No. 10 was infective on one day out of two before quinine was given, but not afterwards; No. 11, on the other hand, continued to infect mosquitoes on each of nine days while quinine was being given. The author concludes that "the results obtained indicate that a crescent carrier is rendered uninfected to mosquitoes after taking 0.04 gram of plasmoquine, and that he remains uninfected for at least three days. (See this *Bulletin*, BARBER *et al.*, 1929, Vol. 26, p. 939, and WHITMORE, *ante*, p. 107.) He finds that plasmoquine cannot prevent almost fully matured crescents from appearing in the peripheral blood, but that gametocytes in the early stages of development are destroyed. Nearly 2,500 laboratory bred *A. maculipennis* and *A. philippinensis* (*funestus*) were employed in these experiments.

W. F.

JAVETT (S. N.). **Plasmoquine in Malaria.**—*Jl. Med. Assoc. South Africa*. 1930. Nov. 22. Vol. 4. No. 22. pp. 689-691.

Dr. Javett has found plasmoquine of great use in his practice. He concludes that, though many would still prefer to use quinine in acute malaria, "Plasmoquine is an effective substitute. . . . It fills the rôle admirably when quinine is contra-indicated, e.g. idiosyncrasy, pregnancy (sometimes), blackwater fever." [Focal necrosis of the liver is often present in blackwater fever, and it is possible that the use of plasmoquine is not without danger, both in this disease and in pregnancy.]

W. F.

MANWELL (Reginald D.). **Further Studies on the Effect of Quinine and Plasmodochin on Avian Malarías.**—*Amer. Jl. Trop. Med.* 1930. Nov. Vol. 10. No. 6. pp. 379-405. [23 refs.] [School of Hyg. & Public Health, Johns Hopkins Univ., Baltimore.]

Five strains of bird malaria were used in these experiments; one of *Plasmodium elongatum*, one of *P. cathemerium*, and three of *P. praecox*. (See WAMPLER, this *Bulletin*, 1930, Vol. 27, p. 655.) Female canaries were inoculated (chiefly intramuscularly) with infected blood. One batch was treated with quinine, and one with plasmoquine; a third batch served as a control. The drugs were administered orally, by means of a

0.5 cc. Luer syringe, with the point cut off the needle which was bent to form an oesophageal tube and covered with a little rubber tubing. Of the three species of parasites, *P. praecox* proved the most susceptible to quinine and *P. elongatum* the least. *P. elongatum*, on the contrary, was the most susceptible to plasmoquine. Sterilization was regularly produced by plasmoquine when used against the last parasite, but quinine was relatively ineffective against this species. In no case was sterilization obtained in infections of *P. cathemerium* with either drug, and in infections of *P. praecox* sterilization occurred in only one bird. Birds which had been sterilized were as susceptible as if they had never been infected, "or had recovered naturally." Plasmoquine did not seem to be nearly as much better than quinine as ROEHL believed, except in the case of *P. elongatum*. *Increasing the dose to the limit of toleration did not add greatly to the efficacy of either drug.* The blood of praecox-infected birds under quinine treatment was infective for clean birds; the blood of those under treatment with plasmoquine was not. Treatment during incubation was more effective than treatment in the acute stage. (But infection was by direct blood inoculation; see S. P. JAMES, above, p. 566.)

W. F.

TSKIMANAURI (G.). Zur Pharmakologie des Plasmochins. [**Pharmacology of Plasmochin.**]—*Nachrichten der tropischen Medizin*. Tiflis. 1930. May-June. Vol. 3. No. 1. pp. 14-22. With 2 text figs. [In Georgian script.] German summary pp. 95-96. [Pharmacol. Inst., Univ., Tiflis.]

The author carried out experiments with plasmochin using dogs and rabbits. Both chronic and acute manifestations were produced. 0.005-0.01 gm. intravenously per kilo body weight produced acute poisoning. Plasmochin proved to be a poison of the central nervous system. In acute poisoning the symptoms appeared in the following order: first paralysis of the vasomotor system with a fall in blood pressure, slowing and then complete cessation of respiration, and only at the end the heart beat stopped; the cardiac rhythm remained undisturbed. From his observations [number not stated in summary] the author concludes that there is nothing against the therapeutic use of plasmochin in malaria, since the lethal and therapeutic doses are widely separated.

E. D. W. Greig.

DE LA CAMARA (Pedro) & MORALEDA (Carmen). Observaciones sobre treinta y un casos de paludismo tratados con quiniostovarsol. [**Thirty-One Cases of Malaria treated by Quiniostovarsol.**]—*Medicina Paises Cálidos*. Madrid. 1931. Mar. Vol. 4. No. 2. pp. 81-94. With 3 graphs in text. [13 refs.] English summary. [Antimalaria Inst., Naval Moral de la Mata, Cáceres, Spain.]

A careful study of 16 patients with *P. vivax* infection, 11 with *P. falciparum*, 2 with both these and 2 with post-malarial splenomegaly, is here presented. A daily enumeration of parasites per cmm. was made both as regards schizonts and gametocytes. Brief notes are given in the letterpress and the results during the treatment by the two first courses (the whole treatment consists of four courses) and during the interval after each of these are shown in tabular form. The results may be epitomized as follows:

1. *Effect on benign tertian infections.* Both schizonts and gametocytes disappeared rapidly, in two days, as with quinine. These results are compared with 40 patients treated with plasmoquine com-

pound in the Instituto Antipaludico de Naval Moral de la Mata, in whom the average time of disappearance of parasites was also two days.

2. *Effect on subtertian infections.* Schizonts disappeared in 2-5 days; in 20 patients treated with quinine and in 140 treated by plasmoquin co. the average was 3 days. Gametocytes, however, were much more slowly acted upon, the average time for their disappearance being 19 days and the extremes 10 and 30 days. The authors noted, as RAYNAL had previously, that the early doses increased the number of gametocytes in the peripheral blood. Compared with quinine the stovarsol compound was much less active against gametocytes, the average time of their disappearance in 20 patients treated by quinine being 10 days and in 140 patients treated by plasmoquine co. 4 days.

H. H. S.

TOSCANO (C.). L'insulino-terapia nella malaria. (*Insulin Therapy in Malaria.*)—*Riv. di Malarologia.* 1930. Nov.-Dec. Vol. 9. No. 6. pp. 734-740. [7 refs.] [Clin. Inst., Univ., Rome.] English summary p. 811.

Seeing that insulin is being tried in the treatment of diseases having no apparent connexion, proximate or remote, with diabetes, the turn of malaria was bound to come. The author gave it to 7 patients suffering with subtertian malaria, and found that in moderate doses, not exceeding 20 units a day, it exerted a beneficial effect on the general condition, the patients showing gain in weight, rise in the haemoglobin index and the erythrocyte count, and a hastening of convalescence, perhaps "by repair of the injuries due to the infection." It has, however, no influence at all on the course of the attack.

H. H. S.

LEGER (Marcel). Le déterminisme de la guérison des paludéens. Relation possible avec le chimisme sanguin. Climato- et crénothérapie. [*Climate and Mineral Waters in the Cure of Malaria.*]—*Bull. Soc. Path. Exot.* 1930. Oct. 3. Vol. 23. No. 8. pp. 820-836. [41 refs.]

Certain mineral waters effect rapid cures. In the central Pyrenees, Encausse-les-Thermes has been famous for centuries. How its waters cure malaria is not understood; the salts it contains are present in only infinitesimal quantities. The author suggests that the problem may be solved by a study of the blood chemistry of malaria patients or by the addition of various mineral salts to cultures of malaria parasites.

W. F.

KLIGLER (I. J.). *Immunity to a Reinfection with Malaria following Treatment.*—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1930. Nov. 25. Vol. 24. No. 3. pp. 331-336. With 2 text figs. [6 refs.] [Dept. of Hyg. & Bact., Hebrew Univ., Jerusalem.]

The author summarizes his results as follows:—

In two groups of children, 42 and 29 in number, treated with a mixture of plasmoquine-quinine which proved effective in curing any

of the three types of malaria, the incidence of the infection two weeks after the treatment was as high as or higher than that before the treatment. It appears, therefore, that children cured from malaria infection do not possess any increased immunity to reinfection. In an adult group the rate of reinfection during the same period was much lower, indicating that in such a group there is a heightened resistance to reinfection. [The numbers were too small. The adult group numbered only 54, 8 of whom were found to be infected before treatment, and 2 at a single examination 17 days after its conclusion.]

W. F.

CARTAÑA (Pablo). La sero-floculación palúdica (reacción de Henry). [**Henry's Reaction in Malaria.**]—*Medicina Paises Cálidos*. Madrid. 1931. Mar. Vol. 4. No. 2. pp. 95-103. [19 refs.] French summary.

The first part of this paper gives an account of the basis of this reaction and of the preparation of endogenes and the reagents used. This need not be repeated (see this *Bulletin*, Vol. 26, pp. 383, 940, 941; and Vol. 27, pp. 211, 212). The second part details the results of the sero-flocculation test in 134 individuals. These were divided into six groups: 1. Thirty non-malarial patients, who had never suffered from the infection; all proved negative. 2. Thirty-six with malarial attacks and parasites in the blood. Blood was taken in the apyrexial interval and all but one were positive. 3. Fourteen with palpable spleens, 11 with parasites in the peripheral blood. The reaction was positive in 12, weakly positive in one other, negative in one. 4. Those with a history of malaria in the distant past, 3-23 years or more, and showing no signs; there were 30 of these, of whom 22 proved negative, 8 distinctly positive. 5. Those without present signs but with a more recent history of attacks, from a few months to 3 years previously. Of 31 such 20 were positive, 11 negative. 6. Seven patients undergoing malaria therapy. Four of these had just started, 3 gave a positive after the first febrile attack, the other after the second. Three others had ceased treatment after 15, 15, and 17 attacks and the test was made 3 months later; the result was a weak positive in each case.

As regards comparisons between the three types of reaction, with metharfer, albuminate of Fe and melanin, the general conclusion is drawn that the last is more marked, occurs earlier and is more delicate and is therefore preferable; the sera tested, however, were few, 32 in all.

H. H. S.

RADOSAVLJEVIĆ (A.). Versuche zum Nachweis von Antikörpern bei Malaria. [**Demonstration of Antibodies in Malaria.**]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1930. Dec. Vol. 34. No. 12. pp. 629-643. [34 refs.] [III. Med. Clinic, Univ., Belgrade.]

The author has investigated malarial blood for complement fixation, antitoxic and antiparasitic properties. The publication of the protocols of the experiments had to be omitted owing to want of space.

As regards the complement fixation reaction he employed as antigen alcoholic extracts of the whole blood containing plasmodia (*P. vivax*, *falciparum* and *malariae*); as control antigen an extract of the whole

blood from healthy persons was made. In inoculation malaria he finds that complement fixation occurs, but not until after the fifth rigor. In cases in which the fever ceases spontaneously the reaction continues positive for 10-30 days and then becomes negative. Successful treatment with quinine, plasmochin and stovarsol converts a positive into a negative reaction, but not sooner than in the case of spontaneous cessation, viz., in 10-30 days.

As the result of his observations he considers that blood serum, taken from malaria patients in whom the fever had ceased spontaneously, has both antitoxic and antiparasitic properties.

Although all precautions were taken in the experiments it is possible, the author concludes, that they may not be entirely free from fallacies. He trusts, however, that they will be repeated on a larger scale.

E. D. W. Greig.

BODECHTEL (G.). Ein Beitrag zur Frage der Uebertragbarkeit der menschlichen Malaria auf Versuchstiere. [**Transmissibility of Human Malaria to Animals.**]—*Klin. Woch.* 1930. Oct. 25. Vol. 9. No. 43. p. 2020.

White mice were injected intraperitoneally with 1 cc. of citrated blood from cases of general paralysis which had been inoculated with benign tertian malaria. The R.E. system of the animals was in some cases blocked with citrate of iron, in others not. After 24-30 hours (2 cases, 48 hours) the thorax of the mice was opened and the heart blood withdrawn and citrated. The heart blood from 2-3 mice was injected into a patient suffering from general paralysis. 10 patients in all were inoculated. Of these 2 died before rigors occurred from sepsis occasioned by bedsores. Of the 8 remaining, 7 showed typical malarial attacks, and 1 had a febrile attack of short duration. The author considers that his experiments prove that human malaria can be "transferred" to white mice, but emphasizes the fact that it is not a "true infection." He stresses the importance of reinoculation of animal blood into man as a test of the presence of the parasites in the former; merely microscopical examination of the blood of the animal is insufficient.

E. D. W. Greig.

SÉGAL (J.). Inoculation à des cobayes nouveau-nés du sang d'un malade atteint de tierce bénigne. [**The Inoculation of New-Born Guinea Pigs with the Blood of a Case of Benign Tertian.**]—*Ann. Parasit. Humaine et Comparée.* 1930. Dec. 1. Vol. 8. No. 6. pp. 590-592. [5 refs.]

Yoshimo MASUTAKA stated that he found benign tertian rings in the corpuscles of young guineapigs, from 2 to 8 days after they had been inoculated subcutaneously with the blood of a benign tertian patient. The author's results did not confirm this; he repeated the experiments, using guineapigs on the day they were born, and injecting blood direct from a patient, without the addition of any anti-coagulant. He examined the blood daily from the second to the eighth day, but without finding parasites, even in thick films. Paralytics were inoculated with 8 cc. of blood taken from guineapigs into which 4 to 5 cc. of human benign tertian blood had been injected 8 to 12 days before: the results were again negative.

W. F.

DALMA (Giovanni) & TUCHTAN (Dario). Nuovo contributo sull' uso della Novirudina nella conservazione del sangue malarico per la malarioterapia. [**The Use of Novirudin for keeping Malarial Blood.**]—*Boll. Istituto Sieroterap. Milanese*. 1930. Nov. Vol. 9. No. 11. pp. 637-641. German summary. [General Civil Hosp., Fiume.]

For preserving blood without coagulation LUSENA used 1 cc. of 1-2 per cent. aqueous solution of Novirudin to every 9 cc. of blood; the authors prefer 3 cc. of 1 per cent. solution to each 7 cc. blood and to ensure sterility they recommend taking the blood into a Behring's venule. They took specimens of malarial blood containing *P. vivax* in this way and kept some in an ice chest, some at room temperature and some at 37° C., and noted the length of time for which the parasites persisted under the different conditions. In that kept on ice parasites were visible under the microscope up to the ninth day, in that at room temperature to the fifth, in that at 37° C. for 24 hours only, the same as in citrated blood. Injecting the blood into patients suffering from nervous diseases, such as dementia praecox, they found that blood kept at room temperature was infective for 24 hours in doses of 4 cc., for 2 days with 10 cc., and 3 days with 20 cc.; that kept on ice was infective for 4, 5, and 6 days respectively with the corresponding doses; in one exceptional case typical malaria resulted from injection of 10 cc. after 10 days; that at 37° C. was apparently not infective. All inoculations were made intravenously. The method should prove useful for sending malarial blood to a distance, provided it is kept on ice.

H. H. S.

JUTZ (Bernhard) & JACOBI (August). Spontanruptur der Milz bei Impfmalaria. [**Spontaneous Rupture of the Spleen in Inoculation Malaria.**]—*Muench. Med. Woch.* 1931. Mar. 6. Vol. 78. No. 10. pp. 395-396. [3 refs.]

The authors observe that although traumatic rupture of the spleen occurs comparatively frequently, spontaneous rupture is extremely rare. In over 1,000 cases of inoculation malaria in Vienna and Hamburg spontaneous rupture of the spleen has been recorded only twice and one of the cases may have been traumatic. The authors' case was a tabo-paretic who was inoculated with malarial blood and 11 days later the rigors commenced. On the 12th day of the fever the patient suddenly collapsed, became comatose, pulseless and extremely pale, and died in a few minutes. The autopsy showed a greatly enlarged spleen with a rupture, 5 cm. long by 1 cm. broad, from the lower end to the hilus. There was no external trauma in this case.

E. D. W. Greig.

SARKISIAN (A. B.). [**The Significance of Reticulocytes in Malaria.**]—*Trop. Med. & Veterin.* Moscow. 1930. Vol. 8. No. 1. pp. 5-10. [In Russian.]

Reticular and granular erythrocytes present in large numbers (up to 40 per cent.) in the blood of the foetus, are very scanty in normal blood (1-6 per cent.). In certain pathological conditions the proportion of these elements is considerably increased, owing to the activity of the bone-marrow. The author has compared the blood of normal and malarial subjects using vital staining methods (Brillantkresylblau, and this stain combined with Giemsa's mixture). It was found that in malarial cases—of all the three varieties and in mixed infections—

the number of reticulo-granular red cells was increased from 12 to 99 per cent. The proportion of these elements present appears to be of diagnostic value in cases where parasites are absent from the blood. During treatment the number of reticulocytes at first rises owing to increased regenerative activity on the part of the bone-marrow, and then gradually falls.

C. A. Hoare.

YORKE (Warrington) & OWEN (D. V.). *Plasmodium ovale*.—*Ann. Trop. Med. & Parasit.* 1930. Dec. 18. Vol. 24. No. 4. pp. 593-599. With 6 figs. [2 refs.]

A patient from Nigeria was admitted to hospital where his blood showed infection with a parasite resembling Stephens's *P. ovale* (see this *Bulletin*, 1923, Vol. 20, p. 296). The parasite was indistinguishable morphologically from *P. malariae*, but its cycle of schizogony was completed in 48 hours. The infected red cells were pale, fragile, frequently oval, usually with an irregular ragged outline, and heavily stippled. Though the strain was passed through five tabetic patients, its characters remained constant. Whether these "are sufficient to justify the erection of a new species, we do not know." (See JAMES on Ziemann's stippling, this *Bulletin*, 1930, Vol. 27, p. 664.)

W. F.

SCHNEIDER (Horst). Arbeitsmethoden italienischer Malariastationen auf der Insel Sardinien. [**Work of the Italian Malaria Stations in Sardinia.**]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1931. Jan. Vol. 35. No. 1. pp. 36-48. With 4 text figs. [10 refs.]

In the parts served by the stations malaria is endemic. The figures for the districts are :—

	Spleen Index.			Parasite Index.		
	1927.	1928.	1929.	1927.	1928.	1929.
	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.
Siniscola ...	53.2	35.0	39.3	10.3	10.3	14.0
Posada ...	100.0	97.0	97.2	24.0	32.5	45.2
Lodé ...	86.9	90.0	93.0	30.0	29.0	15.4
Torpé ...	84.6	92.0	92.0	24.8	12.6	36.5

The antimalarial measures in these places consisted of quinine distribution to the inhabitants and destruction of larvae by Paris green. Local conditions determined which measure should be applied. Thus in Posada antilarval measures were not practicable on account of the amount of marshy land; so quinization was exclusively employed. In discussing the plan of work the author notes that quinine alone has little action on the gametocytes of the parasites, whilst plasmoquine causes them to disappear in a few days. He points out that areas in which the splenic index is from 70 to 100 per cent. are very slightly affected by antimalarial measures, whilst districts in which it is below 70 per cent. are much more amenable.

E. D. W. Greig.

NEVEU (Raymond). L'assainissement des Marais-Pontins. [**The Reclamation of the Pontine Marshes.**].—*Ann. d' Hyg. Pub., Indust. et Sociale.* 1931. Feb. Vol. 9. No. 2. pp. 81-86. [2 refs.]

The marshes, situated between the Apennines and the sea, are soaked with the water which comes down from the mountains in streams blocked by rank semi-tropical vegetation. The engineers have almost completed the construction of a huge dam at the foot of the mountains which directs the water into a great canal, 40 kilometres long, leading to the sea. The plain has been cleared of undergrowth, new roads have been made, and new agricultural colonies have been founded, each with its church, hospital and social club. At Quadrato, an industrial centre has arisen, where the machinery employed in this vast undertaking is repaired, and where windows, doors and furniture for the settlers' new houses are manufactured. Experimental gardens are working under government control to determine the crops best suited for the different parts of the country side, for the soil is not the same over the whole area. All these measures are included under the heading of "Grand Bonification," for which the Government pays 75 per cent. of the cost, the rest being borne by the local authorities and the owners of the land. The author then proceeds to describe the lesser bonification, which consists of anti-anopheline measures, and house-screening combined with a search for all sufferers from malaria and their subsequent treatment. A government quinine factory at Turin turns out 6,000 kilos annually, which is distributed among the inhabitants, who are urged to take prophylactic quinine. (*Ante*, THOMSON, p. 123 ; HACKETT, p. 124.)

W. F.

MISSIROLI (A.). Le grandi bonifiche nei riguardi della biologia e dell'igiene. [**Large-Scale Bonification with Regard to Biology and Hygiene.**].—Supplement to *Riv. di Malariologia.* 1930. Vol. 9. 54 pp. With 14 text figs. & 3 folding plates. [4 pages of refs.]

The author defines "bonifica" to denote hydraulic improvements of soil on which men are working to ensure health from the malarial aspect while maintaining the use of the land. A considerable portion of the article is historical in character, recounting drainage measures during the days of the Roman Empire, in mediaeval times, during the 16th-18th centuries, and finally in the last fifty years. He describes the conditions in Ostia, Isola Sacra (Fiumicino) and Maccarese, the system being that of mechanical drainage—interlacing canals for surface waters, others for deeper water, means of raising the low-lying water and for discharging it into the sea. Pictures are reproduced showing the state of water-logging of the Agro Romano after building the canal before and after the institution of an electric pump for withdrawing water, and an accompanying chart shows the growth of the population and rapid reduction of malarial incidence between 1907 and 1928. Fiumicino and Maccarese are similarly described. Briefly, some degree * of bonification of the delta was carried out in 1889 ; quinine widely used reduced the mortality from malaria, but the incidence remained very high. Later anti-mosquito measures, use of larvicides as Paris green, introduction of *Gambusia*, improvement of drainage and so on were adopted, and in 1919 at Ostia, 1925 at Fiumicino, and 1926 at Maccarese a rapid fall in the number of cases began. Now the official

Coefficiente di morbosita per malaria riferito a 1000 abitanti - Ostia antica -

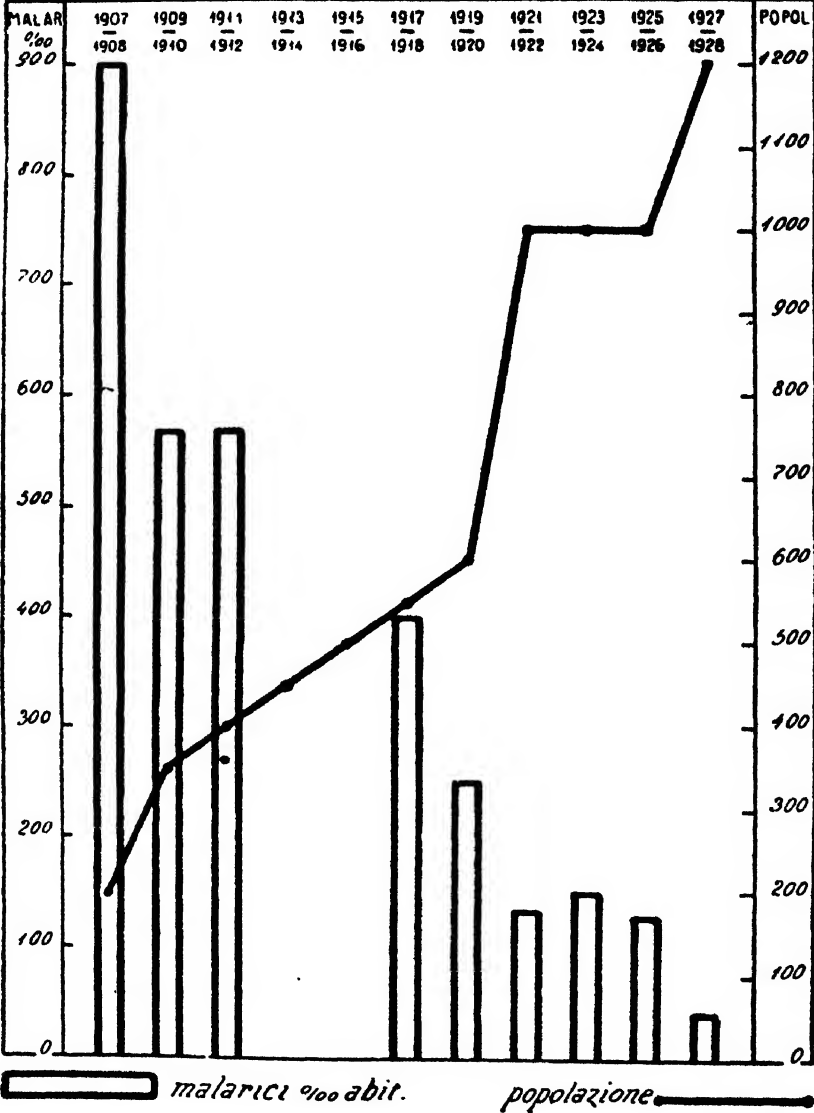


Chart showing the growth of population and reduction in malaria incidence at Ostia antica between 1907-8 and 1927-8.
[Block kindly supplied by the *Rivista di Malariologia*.]

returns give the incidence as 0·4 per cent. at Ostia on the sea and the surrounding area, 2·3 per cent. at Ostia antica and at Fiumicino almost the same (2·19); at Maccarese the figure is 12 per cent., but the measures were adopted later there and full advantage is not yet taken of them, such as screening of houses. The article contains the usual section on the biology of *A. maculipennis* without which no recent author appears to regard his contribution as complete. The whole forms a very interesting account from both the historical and epidemiological aspects.

H. H. S.

MISSIROLI (A.). La prevenzione della malaria nel campo pratico. Terza relazione (1928-1929). (**Prevention of Malaria in Practice. 3rd Report.**)—*Riv. di Malariologia*. 1930. Nov.-Dec. Vol. 9. No. 6. pp. 667-705. With 8 plates. [21 refs.] English summary p. 810.

This is in the main a continuation of the author's previous report (see this *Bulletin*, Vol. 26, p. 34) giving an account of the further results of the same methods, chiefly the extensive use of larvicides, in particular Paris green. The article includes tables giving the results of examination of the inhabitants in more than a score of districts to determine the splenic index, and the parasitic index, the results of the distribution of quinine and the cost of the antilarval campaign. It is not possible to analyse all the detail presented and those interested should consult the original; suffice it to say that the author finds that his former conclusions are confirmed.

H. H. S.

WATSON (Malcolm). **Anti-Malarial Work.**—*Bull. Rubber Growers' Assoc.* 1930. Nov. Vol. 12. No. 11. pp. 605-606.

Sir Malcolm Watson suggests as an emergency measure, during the present crisis in rubber finance, that oil-spraying on healthy rubber estates should be carried out once a fortnight, instead of once a week, from September until the end of the rains in the middle of January; and once every 12 days during the drier part of the year, when the springs are at their purest and *A. maculatus* is breeding rapidly. He also suggests an excavation at the head of every water-containing ravine, into which a sack of bark-scrap, tapioca, or other decomposable matter should be put, with the object of increasing the nitrogen dissolved in the water, and so rendering it less suitable for breeding *A. maculatus*.

W. F.

WALLACE (R. B.). **Cessation of Oiling in a Malarious Area during a Certain Season of the Year.**—*Malayan Med. Jl.* 1930. Dec. Vol. 5. No. 4. pp. 117-125. With 1 chart in text. [1 ref.]

There appears to be a definite malaria season, in Kedah, which lasts from March to September. On certain divisions of the rubber estates, of which the author is in charge, anti-larval oiling was suspended during the off-season, from October 14 to December 31. This was

followed by an increase in the number of breeding places of *A. maculatus*, and also in the number of adults, but the malaria rate declined, as it usually declines at this time of the year. The author concludes that larvicidal measures are unnecessary during this off-season; probably because *A. maculatus* does not cause infection at this time of the year. [See also effects of mosquito prevalence during non-malarious winter months in eastern Bengal, and in rice fields of Assam—League of Nations' report, above, p. 571.]

W. F.

GATER (B. A. R.). **The Asthenobiosis Theory and Larval Surveys.**—*Malayan Med. Jl.* 1930. Dec. Vol. 5. No. 4. pp. 126–128. With 1 text fig.

ROUBAUD's theory of asthenobiosis is to the effect that hibernation and aestivation are due to uraemic intoxication which necessitates a period of reduced metabolism in order to get rid of the waste products. In several districts he found swarms of *A. maculipennis* larvae in small collections of water, but very few adults in the houses. He concluded that the larvae poisoned themselves by constantly ingesting their own excreta, and that the anopheline density of an area should be estimated by adult surveys. The author thinks it possible that too much reliance has been placed upon larval surveys in Malaya, where he has found the adult density of *A. aconitus* at its maximum in December, when there are few larvae; and the larvae most plentiful in February, when the number of adults is declining. He found in the case of *A. maculatus*, too, that when there were few adults, there were numerous larvae in small collections of water; as the adults became numerous, the larvae decreased and were found only in drains, wells, and silt-pits. On Dr. WALLACE's estates, too, the maximum number of larvae was found in December when there are few adults; the maximum number of adults was caught in July. This evidence of inverse density of larvae and adults in Malaya demonstrates the necessity of making adult catches in malaria surveys.

W. F.

CEYLON. **Report of the Superintendent, Anti-Malaria Campaigns, for the Year 1929** [RUSTOMJEE (K. J.)].—*Ceylon Administration Rep. Director Med. & San. Services, 1929.* Appendix. pp. C 66–C 73.

This is an account of the antimalaria measures adopted and the results obtained in several centres. The methods employed were oiling (1 part kerosene, 4 parts fuel oil), Paris green, quinine distribution, and stocking wells with larvivorous fish. Paris green was mixed in the proportion of 2 per cent. by weight with coir dust, but this proved unsatisfactory and a 1 per cent. mixture with slaked lime is being tried. Italian spraying machines were found most satisfactory. In the Kurunegala centre, where work was begun in 1927, the spleen rates were 37 in 1927, 32 in 1928, 18 in 1929. In other centres, such as Chilaw, where the inhabitants object to having their wells treated, the spleen rate is as high as it was in 1927. Experiments with *Esanophile* are in progress.

W. F.

OTTOLENGHI (Donato). La lotta contro la malaria nelle bonifiche. [**Bonification in combating Malaria.**]—Reprinted from *L'Italia Agricola*. 1930. July-Aug. No. 7-8. 24 pp. With 8 text figs.

A good article for readers of Italian.

H. H. S.

INDIAN MEDICAL GAZETTE. 1931. Jan. Vol. 66. No. 1. p. 58.—**Tests for Stock Solutions of Quinine and Potassium Iodide.**

The apparatus described by MEGAW and HAWLEY for checking stock mixtures containing quinine or pot. iodide can now be obtained from Messrs. Boots.

W. F.

DI NATALE (Antonio). La reazione di Wassermann e le reazioni di flocculazione nella malaria. (Wassermann and Flocculation Tests in Malaria.)—*Riv. di Malariologia*. 1930. Nov.-Dec. Vol. 9. No. 6. pp. 741-753. [43 refs.] English summary p. 811. [Roy. Inst. of Clin. Med., Rome.]

HEMENWAY (Ruth V.). One Hundred Malarial Cases. A Summary.—*China Med. Jl.* 1930. Nov. Vol. 44. No. 11. pp. 1118-1123.

HENRY (A. F. X.). Séroflocculation palustre.—*Arch. Ital. Sci. Med. Colon.* 1930. Dec. 1. Vol. 11. No. 12. pp. 723-743. [22 refs.] English summary (7 lines).

KNOWLES (R.), WHITE (R. Senior) & GUPTA (Das). Studies in the Parasitology of Malaria.—*China Med. Jl.* 1931. Apr. Vol. 45. No. 4. pp. 332-347. [1 ref.]

LE BOURDELLÈS (B.) & LIÉGEOIS (R.). La sero-flocculation du paludisme (réaction de Henry); ses résultats cliniques.—*Arch. Ital. Sci. Med. Colon.* 1930. Dec. 1. Vol. 11. No. 12. pp. 744-753. [33 refs.] English summary.

LORANDO (W. J.). Sur quelques facteurs dans la fièvre pernicieuse palustre.—*Bull. Soc. Path. Exot.* 1930. Nov. 12. Vol. 23. No. 9. pp. 927-932. [20 refs.]

DE MIGLIO (Ugo). La campagna antimalarica durante l'anno 1929 nel territorio di Crotone (Catanzaro). (Antimalarial Campaign in the Territory of Crotone (Province of Catanzaro) during 1929).—*Riv. di Malariologia*. 1930. May-June. Vol. 9. No. 3. pp. 303-312. With 1 fig. & 1 map. English summary (9 lines) p. 360.

NOCHT (B.) & MÜHLENS (P.). La cura della malaria con la plasmochina. (The Use of Plasmoquin in the Treatment of Malaria).—*Riv. di Malariologia*. 1930. May-June. Vol. 9. No. 3. pp. 284-302. English summary (8 lines) p. 360.

RONNEFELDT (F.). Zur Plasmochinprophylaxe.—*Muench. Med. Woch.* 1931. Febr. 6. Vol. 78. No. 6. pp. 240-241. [St. Timothy's Hosp., American Mission, Cape Mount, Liberia, W. Africa.]

SARKAR (Sarasi Lal). Some Peculiarities in the Malarial Temperature Charts of Chittagong Hill Tracts.—*Indian Jl. Med. Res.* 1930. Oct. Vol. 18. No. 2. pp. 367-375. With 1 curve in text & 7 charts on 2 plates. [7 refs.]

SCHARFF (J. W.). A Tour in Malariology.—*Malayan Med. Jl.* 1930. Dec. Vol. 5. No. 4. pp. 140-145. With 8 figs. on 2 plates.

ERRATUM.

Vol. 28, No. 2, p. 129. JACKSON's summary, line 1, for Forty-seven children read Four hundred and seventy-one children.

REVIEWS AND NOTICES.

KNOWLES (R.) [I.M.S., Professor of Protozoology, Calcutta School of Tropical Medicine & Hygiene] & WHITE (R. Senior) [F.R.S.E., Malariologist, Bengal-Nagpur Railway] assisted by Assistant Surgeon B.M. Das GUPTA. **Studies in the Parasitology of Malaria.**—*Indian Med. Res. Memoirs. Supplementary Series to Indian Jl. Med. Res.* 1930. Dec. Memoir No. 18. pp. xii+436. With 12 maps, 59 charts, 5 text charts & 1 coloured plate. [Rs. 14-12-0 or 19s. 8d.]

The authors have attempted with great courage and enormous energy to map out the distribution of the three species of malaria parasites throughout the world. This entailed a search of no less than 35 journals for the years 1900-28 and the summarizing of about 600 papers. The result is a great success, so far as success is possible in such a task, and tropical medicine owes them a debt of gratitude for their industry. The work was arduous, and they complain that though malaria has been extensively investigated in the French and Dutch colonies, with publication of the results in well-known journals, information about the disease in the British Empire "is scanty in the extreme." In this connexion they appear to have overlooked the very excellent annual reports published by the governments of our colonies and protectorates which would surely have saved them much labour; for example, they state that information about malaria in East Africa is surprisingly scanty, and all they have to say about Uganda is taken from a report made by CASTELLANI and LOW in 1904, yet the annual reports supply the diagnosis of very large numbers of cases; in the last one from Uganda, the figures were: subtertian 7,048, benign tertian 1,920, quartan 57. Although they were working with statistical data collected from many sources of different value, their results are probably accurate enough to show fairly closely the relative prevalence of each species of malaria in the different countries of the world. For example, they laboriously collected seventeen sets of figures for the Malay States, totalling 1,062 cases; 60.5 per cent. of these were subtertian, 32.4 were benign tertian, and 7.1 were quartan. Now the figures in the annual report of the Protectorate for the year 1929 were in almost exactly the same proportion, namely 15,775 subtertian, 7,850 benign tertian, and 1,019 quartan.

The authors consider it as grave an error to treat a case of malaria without determining the species of parasite, as to treat a case of dysentery without determining whether it is due to amoebae or to bacilli; "it is the realisation of this fact," they say, "which has led to the preparation of the present Memoir." In order to test the practicability of correctly diagnosing the species in routine practice, they gave blood-films to a number of medical men to examine in turn. These men were approaching the end of their six months' D.T.M. course, and had had no end of blood-films to examine during that time, yet there was 59 per cent. of error when they saw only one parasite, and 20 per cent. when they each spent 5 minutes examining the whole of each slide. It is fortunate that quinine is a specific for all three forms of malaria parasite (while emetine cures only one form of dysentery), for it is regrettably true that most cases of malaria have to be treated without any blood examination at all. It would be interesting to know the percentage of error when thick films are examined by experts. Colonel Knowles and his colleagues evidently accept ACRON's finding [not generally confirmed] that quinidine and cinchonidine are of greater value than quinine in the treatment of benign tertian, for they suggest that in places such as Ceylon where most of the malaria is of that type, "the medical authorities might almost strike quinine off their indent for drugs" and use the cheaper cinchona febrifuge instead, but that where the seasonal distribution of the species of parasite is unknown, such economies cannot be thought of.

The results of their researches have led the authors to formulate a most interesting hypothesis of the evolution of the parasites of malaria, which—assuming that they were primarily parasites of mosquitoes only—are probably older than mammals. They believe that *P. malariae* is the oldest of the three types, and they argue from its special association with primitive tribes and its patchy distribution that its present foci are the residuum of a much wider distribution from which it is gradually disappearing. It is the least severe of the three types and this, they suggest, is because it has been the longest in association with man. According to their investigations it appears to have spread from three foci, and "it is possible that the three main foci of *P. malariae* coincide with the supposed sites of origin of the three sub-species of *Homo sapiens* (*caucasiensis*, *mongolensis* and *ethiopicus*)."^{*} One of these foci they place at the corner of north-eastern India, where it meets the boundaries of Burma and China. The second, they consider, was a vast patch extending across the whole of Africa, Madagascar, Ceylon and South India, which were united during the Eocene in the hypothetical Lemuria, and cut off from Northern India by the sea which then filled the Indo-Gangetic plain. This patch was disrupted by the breaking up of the prehistoric continent, and the separation of Madagascar from the mainland, but, in what is left of it, with the exception of East Africa, quartan still flourishes; namely in West Africa, Madagascar, Ceylon and South India; shrinking lakes and a drying climate have driven it from East Africa.* The third focus they put in the Caucasus. *P. vivax*, they consider, was probably the second species to evolve, on the ground that it is more adapted to man than *P. falciparum* and causes less clinical disturbance. "*P. falciparum* we regard as the species (if indeed it be not a separate genus) of most recent evolution." Its maximum output of gametocytes frequently fails to coincide with the most favourable season for transmission, and in this connexion they prophesy, most alarmingly, that "should it ever reach a relative output equal to that of *P. malariae*, coinciding with the commencement of the most favourable season for transmission it might well exterminate man in the tropics." Though it is essentially a book of reference, it is very far from being dull.

William Fletcher.

SIMMONS (James Stevens), ST. JOHN (Joe H.) & REYNOLDS (Francois H. K.). **Experimental Studies of Dengue.**—*Philippine Jl. Sci.* 1931. Jan.-Feb. Vol. 44. Nos. 1-2. pp. 1-251. With 67 text figs. & 3 plates. [125 refs.] [Bureau of Science, Manila, P.I.]

These studies began in the Philippine Islands in 1928, and the chief problems dealt with were: (a) the epidemiology of dengue; (b) the nature of the virus; (c) the various insect vectors of the disease; (d) the transmission of dengue from infected to normal insects; (e) search for a suitable susceptible laboratory animal; (f) serological diagnostic methods; (g) the therapeutic value of immune sera; and (h) the use of a prophylactic vaccine.

The epidemiology was limited to the military personnel. The annual admission rate per 1,000 white troops in the Philippines was 177. A study of the morbidity figures for dengue in the whole U.S.A. Army showed that 97 per cent. of the total dengue cases occurred amongst troops serving in the Philippines, especially in the low lands in and around Manila. In areas where screening was practised the incidence of dengue was reduced along with that of malaria. Both *Aedes aegypti* and *A. albopictus* were proved to be vectors of the disease when fed on dengue patients during the first two days of illness, provided a period of twelve days was allowed for the virus to incubate in the mosquito. These mosquitoes remained infective for 70 days. A single insect was found sufficient to infect. *Culex quin-*

* According to Colonel JAMES quartan malaria has been by no means banished from East Africa.

quefasciatus was not found to transmit the disease, except by direct mechanical transference. Dengue virus from crushed infected mosquitoes did not cause infection when rubbed on intact or excoriated skin. There was no evidence of hereditary transmission of dengue through egg to offspring, but the experiments to test the possible transmission of the virus to larvae in their breeding grounds were inconclusive. Charts were prepared showing how mosquito proliferation and the occurrence of dengue coincided with the rainy season. Natives were shown to possess an acquired but not a racial immunity.

Attempts to demonstrate the virus of dengue both in the blood of dengue patients and in the bodies of infected *Aedes aegypti* by microscopical examination (dark ground illumination and after staining) failed. Carefully planned cultural experiments carried out with many different types of media—including Noguchi's leptospira; N N N; Locke's egg serum; Galloway's spirochaete; hydrocele fluid; heart, spleen, brain, bone marrow, lymph gland, banana, and even mosquito broth—did not demonstrate the presence or growth of dengue virus *in vitro*. The virus was found to pass through a Berkefeld "V" filter.

A clinical study of experimentally produced dengue showed the average incubation period to be 5½ days; duration of fever to be 5 days; that 39 per cent. developed a primary and 69 per cent. a secondary rash; that every case presented a leucopenia with shift of Arneth index to the left. The type of infection was as follows: mild in 13·6, average in 70·4, and severe in 16 per cent. Passage through man and mosquitoes did not appear to alter the virulence of the infection, which probably depended on individual susceptibility. A hundred per cent. of the volunteers infected with dengue were immune to re-infection during the following twelve months, but no specific antibodies were detected.

Vaccines were made from filtrates of suspensions both of dengue-infected mosquitoes and of the dried blood of dengue patients, but were of no prophylactic value.

Many animals were tested regarding their susceptibility to infection with dengue. The disease was transmitted to *Macacus* monkeys, *fuscatus* and *philippinensis*, and was re-transmitted from them to man. Unfortunately for diagnostic purposes, the monkeys showed no pyrexial or leucocytic evidence of disease. Guinea-pigs, rabbits, mice, chickens and lizards proved non-susceptible.

These researches were carefully carried out and for the most part add valuable confirmation to the findings of earlier authors, including ASHBURN, CRAIG, SILER, HALL, HITCHENS and CLELAND.

Harold E. Whittingham.

THE VETERINARY BULLETIN. 1931. April. Vol. 1. No. 1. pp. 1-96.

—Published by the Imperial Bureau of Animal Health, Weybridge, Surrey, England. [Price 7s. 6d. net. Annual subscription £1.]

The first number of the new Bulletin published by the Imperial Bureau of Animal Health is naturally of interest to this Bureau which was from 1912 to 1930 responsible for its precursor. It consists of 88 pages of text containing summaries of 168 papers, and has a full Contents under 13 headings. In the present year four numbers will be issued; from 1932 onwards 12, making a volume of about 600 pages.

The number is well turned out and the proof-reading good. The reviewer suggests, however, that if the Editor desires contented readers, he should take the opportunity of the next volume to shorten the line of print.

A. G. B.

BUREAU OF HYGIENE AND TROPICAL DISEASES.

TROPICAL DISEASES BULLETIN.

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[No 8

DENGUE AND PAPPATACI FEVER.

LORANDO (N.) & CHANIOTIS (N.). Sur la dernière épidémie de dengue en Grèce: faits cliniques et épidémiologiques. [**The Last Dengue Epidemic in Greece.**]—*Rev. Méd. et Hyg. Trop.* 1931. Jan.-Feb. Vol. 23. No. 1. pp. 23-31. With 3 charts in text. [14 refs.]

It has been suggested that the disease in the 1928 epidemic of dengue in Greece differed clinically from that of the epidemics in southern Europe in the years 1883-89. The authors have studied the earlier records and find that there were indeed certain differences in the clinical picture. In the recent epidemic the temperature charts showed as a rule continuous fever for about six days with occasionally a slight remission of a degree or so on or about the third day, whereas the charts of 1883 show an actual intermission on the 3rd day followed after 24 hours or so by a sharp recrudescence of fever and other symptoms. In 1928 haemorrhages and albuminuria were common; this was not so in the earlier epidemics. Again, fatal cases were fairly numerous in 1928 but were very few in 1883-89.

As regards the epidemiology there are still some observers who think that the infection can be carried by means of discharges from the patient or possibly by the desquamated skin. The authors are convinced that the infection is carried in nature from person to person only by means of stegomyia bite. In support they cite one or two instances: A medical man practising in Athens sent his wife and family to a stegomyia-free district as soon as dengue broke out in the city; a few weeks later he contracted dengue and his wife returned to look after him; two days after her return again to the country she became ill with dengue and was nursed by the servants and others in the house, none of whom contracted the disease, nor did anyone else in this district; some time later one of these servants went to Athens and in six days became ill with dengue. Again, in a small town in a stegomyia-free district 20 cases of dengue were reported; investigation showed that all these people had recently come from Athens for the holidays. No one else in the town developed dengue. In the opinion of the authors in these epidemiological observations the possibility of infection by contact is excluded.

D. Harvey.

PIROT (R.). Dengue d'extrême-Orient et dengue du bassin méditerranéen. [**Dengue of the Far East and of the Mediterranean.**]—*Rev. Prat. Malad. des Pays Chauds.* 1930. Apr. Vol. 10. No. 4. pp. 151–158, 161–166. [51 refs.]

The author considers that many "fevers of uncertain origin" in the tropics are really atypical dengue, i.e., sporadic cases arising in a population partially immunized by previous attacks. That true dengue (identical with the fever as it occurred in Greece) may and does arise in the tropics he is convinced and refers to a paper describing an outbreak of typical dengue on ships of the French Navy in Saigon Harbour in 1926 [this *Bulletin*, Vol. 24, p. 628].

The interesting point of this outbreak was that a period of eighteen days elapsed between the occurrence of the first case and the beginning of the outbreak aboard the ships, in which some 90 per cent. of the personnel, all susceptible people, suffered. This long incubation period is explained by the author in the light of the work of SILER in America and BLANC in Greece as being made up as follows: three days when the patient was infective for the mosquito, eleven days incubation for the virus in the mosquito and five to six days incubation of the disease in the susceptible people.

The author gives a detailed account of the symptoms of these cases which agrees in every respect with that of the Athens cases.

On the other hand when the disease spread to the shore its advance was slow and there were gaps in its distribution due to the presence of immune or partially immune native inhabitants or old settlers, but wherever there were groups of new arrivals, the disease spread rapidly and practically all were attacked.

The chief points in the clinical picture are the temperature charts with recrudescence, the temperature-pulse ratio, the leucopenia with relative mononucleosis and the nature of the rash.

D. H.

HUSSAMEDDIN. La dengue en 1928–29 en Turquie. [**Dengue in Turkey, 1928–9.**]—*Bull. Office Internat. d' Hyg. Publique.* 1930. July. Vol. 22. No. 7. pp. 1356–1357.

The epidemic of dengue in Greece in 1928 spread to Turkey in the same year, first appearing in Fethiye and at Adalia and Smyrna, 455 cases in all were noted. It ceased entirely in January 1929. In view of the prevalence of *Stegomyia* it was feared that there would be a recrudescence in the following summer and vigorous anti-mosquito measures were undertaken. Only 79 cases were, however, observed and none at all since.

D. H.

MORGAN (E. L.). Dengue (P): Report on an Unusual Epidemic in the Murrumbidgee River Basin.—*Rep. Director-General of Public Health New South Wales for Year 1929.* pp. 113–115. [10 refs.]

In 1928 in the Riverina district of New South Wales there was an outbreak of a disease which resembled mild dengue. In most cases the chief symptoms were joint pains and a herpetic or morbilliform

eruption. The temperature chart did not resemble that of typical dengue and in some cases there was no fever at all. The majority of the medical men considered that the disease was mild dengue, a disease not previously recorded from this district which is about 250 miles south of the lowest known southern limit at which *Aedes argenteus* has been found. However, other mosquitoes of this genus are numerous in the locality, for instance *Ae. annulipes* and *Ae. theobaldi*, and it is quite possible that one or other of these can transmit the disease.

D. H.

AUBIN A propos des dengues exotiques. [*Dengue in the Tropics.*]—*Presse Méd.* 1930. Aug. 9. Vol. 38. No. 64. pp. 1078-1079. With 4 text figs.

It has been suggested that the dengue-like fevers of the tropics are not the same as the disease which caused the epidemic in Greece in 1928. The author does not agree; he gives temperature charts of cases which he has met in French Indo-China the symptoms of which were typical of dengue. In his view sporadic cases of dengue occur in small groups throughout the year in the tropics with the result that the population has an acquired resistance, whereas in the Mediterranean area the cities are free from dengue for five, ten or twenty years, and when a case is introduced the disease spreads like a fire through the non-immune population.

D. H.

MÉLANIDI (C.) & STYLIANOPOULO (M.). La dengue en pathologie vétérinaire. [*Dengue in Veterinary Pathology.*]—*Rev. Gén. de Méd. Vét.* 1930. Oct. 15. Vol. 39. No. 466. pp. 640-643. [6 refs.]

The authors refer to articles published recently describing a dengue-like fever in animals, especially cattle and horses. In 1927 a fever lasting three to four days was noted in the horses of the Cavalry in Athens. It preceded cases of dengue in man. A few cc. of blood taken from horses at the height of the fever produced a similar fever when injected into healthy horses. During the epidemic of dengue in the city no cases of fever were noted in horses or other animals. 10 cc. of blood from typical cases of dengue taken at the height of the fever and inoculated into horses gave no result.

D. H.

SPYROPOULOS (Nicolas J.). La dengue chez l'enfant. (Pandémie d'Athènes de 1928.) [*Dengue in the Child in the Athens Epidemic.*]—*Acta Paediatrica.* 1930. Aug. 18. Vol. 10. No. 1-2. pp. 59-66. With 3 text figs.

It has been stated that young children are more resistant to dengue than adults but in the Athens epidemic this was not so; all ages were equally attacked. In small children the onset was frequently accompanied by vomiting and convulsions, symptoms rare in the adult. The initial rash was well marked, especially on the face. The children looked as if they had just been in a very hot bath. In small children the pains in bones and muscles were not noted but in older children headache was a constant symptom. Haemorrhagic symptoms were less common than in adults. The mortality even in the newly born was less than in adults.

D. H.

PAMBOUKIS (Georg). Denguefieber und Nervensystem. [**Dengue and the Nervous System.**]—*Schweiz. Arch. f. Neurol. u. Psych., Arch. Suisses de Neurol. et Psych.* 1930. Vol. 26. No. 1. pp. 51–62. [31 refs.]

The author cites a case under his own observation of a man who had suffered from tachycardia for many years; he contracted influenza and the tachycardia was markedly aggravated; in 1928 he contracted dengue and instead of tachycardia had bradycardia with a pulse rate of 60–70. In convalescence the tachycardia returned.

Cases with high blood pressure showed a remarkable lowering of pressure during an attack of dengue. This is probably due to a dilatation of the peripheral blood vessels. In the case of a man who had suffered from symptoms of angina pectoris for some years an attack of dengue was followed by complete freedom from angina. A patient in whom arteriosclerosis of the coronary arteries was present also enjoyed freedom from attacks after dengue.

Several instances of improvement in cases of central nervous diseases during and after an attack of dengue are recorded. For instance, hemiplegia, Parkinsonism following encephalitis, epilepsy, etc.; this action of the dengue fever toxin is compared with that of malaria on G.P.I. The author considers that the toxin acts therapeutically on these cases (1) by its action on the lymphocytes; (2) by its vaso-dilatory action.

D. H.

JOANNIDÈS (Georges Sp.). L'examen morphologique du sang dans la fièvre dengue. [**Blood Examination in Dengue.**]—*Arch. Inst. Pasteur Hellénique.* 1930. Vol. 2. No. 2. pp. 295–298. [11 refs.]

The author has made a careful examination of the blood cells of cases of dengue in stained films. He could find no evidence of alteration in the red cells and no contained microorganisms. In the large mononuclears and polymorphonuclears he found changes, most pronounced in severe cases, consisting of condensation and fragmentation of the nuclear substance, portions of the nucleus being extruded into the protoplasm. He considers that these effects are due to a leuco-toxin which acts not only directly on the white cells in the blood stream but also on the blood-forming organs, thus accounting for the leukopenia and the presence in the peripheral blood of these damaged cells.

D. H.

BLANC (Georges) & CAMINOPETROS (J.). Comment les faits épidémiologiques, en Grèce, montrent le rôle exclusif joué par le *Stegomyia fasciata* (*Aedes aegypti*) dans la transmission de la dengue. [**Epidemiology of Dengue in Greece. Exclusive Rôle of *Aedes aegypti*.**]—*Arch. Inst. Pasteur Hellénique.* 1930. Vol. 2. No. 2. pp. 277–294. With 7 text figs. (1 map). [14 refs.]

The experimental work of the authors and of previous workers has clearly demonstrated that dengue is transmitted by *Aedes* and by this mosquito only. In order to convince sceptics the authors undertook the present epidemiological survey in Greece and Macedonia, and they show clearly that the distribution of dengue in these countries coincides exactly with that of *Aedes*.

A map shows that one central area in Greece is free from *Aedes* and this area alone escaped the epidemic. In Macedonia also the western area is free from *Aedes* and also from dengue. The absence of *Aedes* is

explained by the fact that every village and dwelling has its own stream of running water, no water is stored and so no breeding places are provided. In the other areas running water is not found, water is stored in and about the houses and *Aedes* are abundant. In the city of Salonica in certain areas *Aedes* abound; in other areas the mosquito is not found. Many cases of dengue occurred in the first, none or very few cases in the other areas. *Culex* and sand flies abounded in all areas in the city. The authors quote three special instances (already referred to in this *Bulletin*, Vol. 26, p. 833) which furnish remarkable evidence as to the rôle of *Stegomyia* in dengue transmission.

D. H.

MANOUSSAKIS (E.). Le mode de transmission de la fièvre dengue. [**The Mode of Transmission of Dengue Fever.**]—*Rev. d'Hyg. et de Méd. Préventive*. 1931. Jan. Vol. 53. No. 1. pp. 18-23. [9 refs.]

There are still some persons who believe in direct transmission of dengue from case to case; the chief argument advanced being that such an epidemic as that in Greece was too explosive and extensive in its origin to be explainable by the mosquito theory. This would presuppose that practically all the mosquito population of the city had suddenly become infective. But in the opinion of the author for some weeks before the explosive outbreak sporadic cases were cropping up which passed unrecognized, with the result that large numbers of mosquitoes gradually became infective. In 1928 the epidemic apparently commenced towards the end of July, yet sporadic cases were actually noted by the author as early as April and occurred in increasing numbers during May and June. It has also been noted that cases of dengue occurred in Greece during November and December when mosquitoes do not appear but the weather is unseasonably warm. During the experimental work carried out by the author and others in the clinic there was no single instance of direct infection.

D. H.

SNIJDERS (E. P.). Over de overbrenging van de endemische Sumatransche dengue. [**On the Transmission of the Endemic Dengue of Sumatra.**]—*Geneesk. Tijdschr. v. Nederl.-Indië*. 1931. Mar. 1. Vol. 71. No. 3. pp. 241-249. With 3 graphs in text & 3 figs. on 2 plates. [2 refs.] [Path. Lab., Medan, & Colonial Inst., Amsterdam.]

The relations of dengue and yellow fever have been recently discussed. Accidental laboratory infections with yellow fever show a striking likeness to dengue. The immunity against yellow fever of monkeys (*Cynomolgus*, *Nemestrinus*) from countries where dengue is endemic appears to be an acquired one since young individuals of both species are just as susceptible to yellow fever as the Rhesus from Northern British India, the usual experimental animal.

The author sought to find out whether dengue in the Dutch East Indies is transmitted by *Aedes* as it is elsewhere and also to obtain a strain of dengue virus for experiments in Holland in connexion with yellow fever, which latter experiments may not be undertaken in the East.

Laboratory cultures of *Aedes aegypti* and *A. albopictus* were obtained. The technique of their breeding, the experimental infection and the transport to Holland of the infected mosquitoes are described.

During July, August and September 1930 a dengue epidemic occurred at Medan. Often a few cases in one house were followed about 10-14 days later by a similar house epidemic next door. There were many typical cases (saddle-back curve, leucopenia, initial and terminal rash, enanthema, long lasting pains in the joints).

Three successful transmission experiments are quoted in detail. After mosquitoes had fed on dengue patients at Medan on the 2nd or 3rd day of the disease and been transported to Holland, 30, 35 and 40 days after the infectious meal, volunteers were exposed to their bites and developed typical attacks of dengue after an incubation of 5-7 days. *A. aegypti* as well as *A. albopictus* carried the infection.

In the discussion following the reading of this paper at the medical society at Medan the question was asked whether dengue fever is distinguishable from "Van der Scheer's fever." The author answered that he had been inclined to make this distinction but that the epidemiological connexion between cases which clinically showed differences urged him to consider the diseases as probably etiologically identical. He proposes to speak of the "dengue group."

W. J. Bais.

PONTANO (Tommaso). Immunitätsprobleme und experimentelle Uebertragung des Denguefiebers. [**Problems of Immunity and Experimental Transmission of Dengue.**—*Ztschr. f. Immunitätsf. u. Experim. Therap.* 1930. Vol. 69. No. 1/2. pp. 146-156. [Clinic for Infectious Diseases, Univ., Rome.]

Dengue cannot be studied by experiment on animals but experimental work has been done on men who had volunteered during the epidemic in Greece. As a result of such studies on twenty-six volunteers the author concludes that:

The virus of dengue is viable in serum taken from cases of the disease and kept at room temperature for two months. No natural immunity was noted. The immunity following an attack of the disease lasted about four months. The incubation period of the disease experimentally produced, whether by intravenous or intramuscular injection, was from 6 to 7 days, with extremes of 9 and 12. The serum from atypical cases produced in some instances cases typical clinically.

D. H.

MARZINOWSKY (E. I.). Sur la lutte contre la dengue. [**Measures against Dengue.**—*Bull. Soc. Path. Exot.* 1930. Oct. 8. Vol. 23. No. 8. pp. 797-803.

The author refers to the 1928 outbreak of dengue in Athens and the danger of the introduction of the disease into the Soviet Republics. A conference met in Moscow in March 1929 and papers were read on this subject. The conference concluded that the vector of dengue, *Aedes aegypti*, is widespread in the Republic and suggested a number of measures, one being that basins of water might be used as mosquito traps and emptied every four days, other breeding places being regularly eliminated.

D. H.

MERTENS (W. K.). Experimenteele van der Scheer's koorts. (Voorloopige mededeeling.) [*Experimental van der Scheer's Fever.*]—*Geneesk. Tijdschr. v. Nederl.-Indië*. 1931. Mar. 1. Vol. 71. No. 3. pp. 250-259.

Contrary to SNIJDER's opinion (see above) the author distinguishes Van der Scheer's fever from dengue on account of (1) its endemic rather than epidemic occurrence, (2) its better prognosis, (3) the fact that it especially attacks new comers, whereas dengue makes no exceptions, (4) the absence of long lasting joint pains, (5) the slow pulse in Van der Scheer's fever. [Yet the description given by the author of his experimental cases shows such a similarity to dengue (initial and terminal rash, exanthema, leucopenia, pronounced prostration), and the picture is so variable that this distinction appears hardly justified.]

The author succeeded in infecting individuals at Tjimahi (Java) at an altitude of 2,400 feet, where spontaneous cases of Van der Scheer's fever are rare, either by injection of serum from patients at Batavia or by the bite of experimentally infected mosquitoes. Of 28 serum injection experiments 25 succeeded. Even 0.1 cc. intravenously administered was sufficient. Of 23 experimental infections by means of the bite of *Aedes aegypti* 19 succeeded. The average incubation period was about 6 days. The mosquito needs at least 9 days after the blood meal to become infective. It may remain infective for at least 65 days after the bite. The bite of one mosquito suffices to produce the disease.

Of 5 experiments with *A. albopictus* 4 succeeded. The bites of at least 21 mosquitoes were necessary to cause infection. The intrinsic incubation period of the virus in this species is not yet known.

The virus is filtrable. In the frigidary at 10-15° C. it may be kept for at least 40 days. It may be dried in vacuo and can be kept in this condition for at least 2 months. It is killed by heating ($\frac{1}{2}$ hour at 56° C.). It is found in the blood of patients for at least four days in diminishing quantities.

In the mosquito the virus apparently simply increases in quantity and does not undergo any special development. Though infection was not possible by the bite of a freshly infected mosquito, it could be obtained by injection of a filtrate of the bodies of 50 freshly infected mosquitoes, rubbed to an emulsion in serum.

The immunity caused by the disease is not great. Reinfections usually succeeded and always did so if the virus was administered by means of serum injection.

W. J. Bais.

TRABAUD (J.). Les traits cliniques spécifiques de la fièvre de trois jours ou fièvre à phlébotomes. [*Specific Clinical Features of Three Day or Sand Fly Fever.*]—*Bull. Acad. Méd.* 1930. Dec. 30. Year 94. 3rd Ser. Vol. 104. No. 42. pp. 791-795. With 2 charts in text.

The author points to the confusion in the clinical diagnosis of dengue and sandfly fever. He cites the following chief points of difference:—

In three day fever (sandfly fever) the temperature runs to over 40° C. in the course of a few hours and without prodromal symptoms; the following morning it drops a degree or so and reaches normal on the third day.

Three day fever is a congestive fever; this is demonstrated chiefly by the very severe headache and the reddened conjunctivae: the pathognomonic sign.

Three day fever is a neurotropic affection acting chiefly on the posterior portion of the cord and causing severe pains in the muscles and bones; the cerebrospinal fluid is under increased pressure.

There is no rash in sandfly fever in contrast to dengue, and relapses are very rare indeed. Convalescence is slow with a long period of weakness.

D. H.

KREMER (B.). **The Questions of Studying the Pappataci Fever of Crimea.**—*Rev. Microbiol., Epidémiol. et Parasit.* Saratov. 1930. Vol. 9. No. 3. pp. 395-400. [In Russian. English summary.]

The author has made a survey of the Crimea in order to establish the incidence and distribution of sandfly fever. The only species of the fly found in the country are *Phlebotomus papatasi* and *P. perniciosus* var. *tauricus*. The former occurs only in Sebastopol and the adjoining districts and along the railway line as far as Bakhchisarai. Sandfly fever coincides with the distribution of *P. papatasi* and does not occur in any other part of the peninsula, where *P. perniciosus* var. *tauricus* is prevalent. The disease was studied more fully in Sebastopol. Here the principal foci are in the lower parts of the town, overgrown with verdure and protected from wind. The outbreaks of fever occur from the middle of June to the end of September, reaching a maximum in August.

C. A. Hoare.

TRABAUD (J.). Sur le neurotropisme de la fièvre de trois jours. [**Neurotropism of Three Day Fever.**]—*Bull. Acad. Méd.* 1931. Feb. 10. Year 95. 3rd Ser. Vol. 105. No. 6. pp. 218-222. [5 refs.]

The author believes that the headache and pains in the back and limbs in three day fever are evidence of affection of the nervous system by the virus. The headache may be so severe as to simulate meningitis yet the cerebrospinal fluid is found to be normal. The headache and the pain and congestion in the eyes are evidence of congestion of the meninges.

In the same way the author explains the pains in the back and limbs as due to a congestion of the peripheral nerves. This does not affect the joints or bones but chiefly the periarticular tissues, the tendon attachments, muscles and fascia. In this way it differs from the rheumatism virus which attacks the joints and heart, and from dengue which only occasionally is neurotropic and invariably is accompanied by a rash.

D. H.

DIAMANTOPOULOS (Jakob). Denguefieber und Myxödem.—*Deut. Med. Woch.* 1931. May 15 Vol. 57. No. 20. p. 851.

UNCLASSED FEVERS.

SCOTT (Harold). Le typhus tropical et les maladies connexes. [**Tropical Typhus and its Allies.**]—*Bull. Office Internat. d' Hyg. Publique.* 1930. Aug. Vol. 22. No. 8. pp. 1522-1526. [1 ref.]

A communication presented to the Committee of the "Paris Bureau" by Sir George BUCHANAN, the British delegate.

The term "tropical typhus" has been applied to various maladies which resemble in some respects true typhus but at the same time show important points of difference. They are as a rule met with in tropical zones but also occur in sub-tropical and temperate regions. A classification based on the vector of the disease has been attempted thus: Fevers transmitted by the louse, by the tick and by the mite, but there are varieties which do not fall into any of these categories.

Rocky Mountain fever comes in the second class and also differs from true typhus in crossed immunity experiments. In Malaya there are two types of tropical typhus, the one known as scrub typhus which is probably due to the bite of a mite or tick and in which the Weil Felix reaction is positive with one strain of *Proteus*; the other occurs almost invariably in the towns and is probably louse borne; the Weil Felix reaction here is also positive but with a different strain of *Proteus*. The scrub typhus of Malaya resembles in some respects Japanese River Fever whereas the urban type is more allied to Brill's disease.

Indian "tick typhus" is another form of the disease similar in its clinical characteristics and usually with a definite history of tick bite, with a small primary ulcer resembling the "tache noire" of Marseilles fever.

Similar fevers have been described in different regions of Africa so far removed as Tunis, Nairobi and the Transvaal. In Palestine also a similar disease has been described as mild typhus with a positive Weil Felix reaction; lice can be definitely excluded as vectors. Ross in Rhodesia has described a fever resembling the eruptive fever of Marseilles in which the Weil Felix reaction for both strains W and K was negative.

In Australia in the sugar cane plantations a similar fever occurs, to which the local name of "mouse disease" has been given; here the Weil Felix reaction is found positive and the probable vector is a mite.

In the southern states of North America another type of mild typhus is met with; this is considered identical with "tabardillo" of Mexico, and the Weil Felix reaction is positive. The infection here as in most of the tropical typhus fevers is not from man to man by the louse but probably from some intermediate host such as the rat or mouse.

Marseilles fever has recently occupied considerable attention; it differs from Brill's disease in that the monkey reacts to injections of infective human blood whereas the guineapig does not and infection with typhus virus does not render animals immune to infection with Marseilles fever blood. The Weil Felix reaction varies in different patients. A similar fever has already been described in Tunis, and in Rome, Spain and Portugal.

D. Harvey.

MEGAW (J. W. D.). Les fièvres ressemblant au typhus transmises par les tiques. [**Typhus-like Fevers transmitted by Ticks.**].—*Bull. Office Internat. d'Hyg. Publique*. 1930. Aug. Vol. 22. No. 8. pp. 1527-1547. [14 refs.]

A memoir presented to the Committee of the "Paris Bureau" by Colonel GRAHAM, delegate for British India.

The author suggests that the typhus fevers should be classified according to the known vectors, louse, tick or mite, and he is convinced

that those types of fever the vectors of which are not yet known will soon fall into their proper places. Great confusion has already arisen owing to the custom of giving place names to diseases and he cites Rocky Mountain fever, Japanese River fever, Malta fever, Delhi boil as cases in point.

In 1916 at Seth Tal in the Kumaun Hills the author was bitten by a tick and twenty-one days later suffered a severe attack of typhus-like fever; since then other cases have been noted and in this communication those in which there was a definite history of tick bite are described, although in no instance was the tick captured and identified. Accounts of eleven such cases are given and reference is made to those of a similar type described in other parts of the world and already referred to by Dr. SCOTT.

The Weil Felix reaction according to Megaw is negative in cases of tick typhus in India but in one outbreak of nine cases which occurred in a regiment of Gurkhas marching through hilly country in Madras the serum of one case gave a positive Weil Felix reaction in a titre of 1-1000.

D. H.

PLAZY (L.) & MARCANDIER (A.). A propos d'un essai de classification des fièvres typho-exanthématiques. [**Classification of Typhus-like Fevers.**—*Bull. Soc. Path. Exot.* 1930. June 11. Vol. 23. No. 6. pp. 560-562. [9 refs.]

The authors refer to a recent paper by TOULLEC [*ante*, p. 96] in which he attempts to classify the typhus-like fevers according to the vector. While they agree that it is not possible to separate these fevers on clinical grounds alone, they consider that classification by vector is premature. In their view it is at present possible to say that in cases of true typhus the Weil Felix reaction appears early and is as a rule of a titre greater than 1-2000, whereas in the pseudo-typhus cases it does not become positive till near the end of the fever and is rarely found in higher titre than 1-1000.

D. H.

OLMER. La fièvre exanthématique. [**Eruptive Fever.**—*Bull. Office Internat. d'Hyg. Publique.* 1930. Aug. Vol. 22. No. 8. pp. 1494-1521. With 7 diagrams and 2 figs. (1 coloured). [Refs. in footnotes.]

This report, communicated by General L'HERMINIER to the Committee of the International Office of Public Health or "Paris Bureau," is a general résumé of the observations of Olmer and his colleagues, treated from the historical, clinical, experimental and epidemiological aspects. With the clinical description is given a very instructive coloured plate showing the eruption on the legs.

All attempts to isolate the causal organism by culture or by inoculation into guineapigs failed but inoculation of the blood of patients taken from the 5th to the 8th day of fever into monkeys produced a definite fever after an incubation period of 7 to 9 days; temperature charts from some of these experiments are given. The fever can be passed from monkey to monkey by inoculation of blood. Guineapigs which had failed to react to blood from these cases showed the usual

reaction after inoculation with typhus blood, and monkeys which had reacted to eruptive fever-blood also reacted later to typhus blood, and vice versa.

In nine cases tested for the Weil Felix reaction five gave a positive reaction from 1-250 to 1-500 and even in one case, 1-1000. The four others gave a titre of 1-100 but no higher.

This fever occurs in the summer and chiefly in July and August, and there is no infection from case to case, although two or more cases may arise in the same house at considerable intervals. No lice or other parasites have been found on the patients and the author is convinced that lice may be definitely excluded as vectors. Lice fed on infected monkeys and ground up and injected into other monkeys did not give rise to any fever. DURAND and CONSEIL have recently shown that infection can be carried by ticks.

The author is strongly of opinion that eruptive fever is not related to typhus or Brill's disease, but agrees that it is similar to the "fièvre boutonneuse" of Tunis.

D. H.

OLMER (D.) & OLMER (Jean). La fièvre exanthématique. Son inoculation, ses portes d'entrée, ses aspects cliniques. [**Eruptive Fever.**]—*Bull. et Mém. Soc. Méd. Hôpit. de Paris*. 1931. Feb. 9. Year 47. 3rd Ser. No. 4. pp. 167-171. [4 refs.]

This is a résumé of previous papers by the same authors. A careful description is given of the primary sore or "tache noire." The authors consider that a diagnosis can be made on the discovery of a typical sore even before the appearance of the rash and that this sore should invariably be carefully sought for as it is one of the cardinal signs of the disease. The rash is fully described. The authors refer to one or two cases in which the typical "tache noire" was seen at the site of a tick bite though fever did not develop. It has also been noted that in one household there may be a typical severe case of the fever with a marked rash and other individuals with only a mild fever lasting 4 or 5 days, with a typical sore and adenitis, but never showing any rash. On the other hand, although rarely, very severe cases may be seen with severe headaches and joint pains, high fever and occasionally meningeal signs. Even these patients practically all recover; the few fatal cases met with being in people who were already suffering from some chronic affection of the heart or kidneys.

D. H.

LEMAIRE (G.). Petite épidémie algéroise de la maladie de Connor et Bruch; papulo-érythème polymorphe infectieux saisonnier à papules rutilantes; synonymes: fièvre boutonneuse de Tunisie, fièvre exanthématique de la région provençale. [**A Small Epidemic in Algiers of the Fever of Connor and Bruch.**]—*Presse Méd.* 1930. Dec. 31. Vol. 38. No. 105. pp. 1801-1804. With 4 charts in text.

Up to date no cases of eruptive fever have been reported from Algiers; the author reports ten such, four in some detail. The fever is obviously identical with that described from Tunis, Marseilles, Rome and elsewhere. After an elaborate and detailed description of the rash, the author suggests that the names given to the disease are not

descriptive and suggests the comprehensive title of this paper, which, however, would certainly not tend to simplify matters. The "tache noire" or primary sore was noted in all ten patients on the lower limbs, suggesting the bite of a crawling insect which had dropped on the ground from its habitual host, a dog or a cat. In one case a small tick, species not determined, was removed from the skin. Two days later this person developed fever and passed through a typical attack; a small pustule developed at the site of the tick bite and subsequently developed into the true "tache noire." All cases were severe but all recovered.

D. H.

BOINET & PIERI (Jean). Fièvre exanthématique et fièvre boutonneuse. [**Eruptive Fever and Fièvre boutonneuse.**]—*Marseille-Méd.* 1930. June 15. Vol. 67. No. 17. pp. 798-806. [4 refs.]

The authors are apparently not satisfied of the identity of eruptive fever with the Tunisian "fièvre boutonneuse," but the only points of difference they can suggest are:

(1) That the "tache noire" is present in Marseilles fever and not in the Tunis variety. [RAYBAUD (see below) points out that the "tache noire" is often not noted in the Marseilles fever and is probably the site of the bite of the tick.]

(2) There are slight differences in the character of the rash, which appears commonly on the soles and palms in the Tunis fever but rarely or never in the Marseilles type.

The recent discovery that these fevers can be caused by injection of emulsion of infected ticks should soon settle the question of their identity or non-identity.

D. H.

VÉDRENNE. Observations sur la fièvre exanthématique méditerranéenne. [**Observations on Mediterranean Eruptive Fever.**]—*Bull. et Mém. Soc. Méd. Hôpit. de Paris.* 1930. Dec. 8. Year 46. 3rd Ser. No. 33. pp. 1747-1750. [1 ref.]

The author saw twelve cases of this disease in the summer of 1930 in Cannes. Three typical cases, in women, are described. All kept dogs which were infested with ticks and two of these dogs are said to have died from the infestation. In two of the cases a typical "tache noire" was noted. A sister of the third patient who bathed her dog was bitten by several ticks but did not develop the disease.

D. H.

GULINO (Michele). Su alcuni casi di febbre esantematica, riferibili al tifo esantematico benigno. [**Cases of Eruptive Fever resembling Benign Typhus.**]—*Riv. Sanitaria Siciliana.* 1930. Dec. 1. Vol. 18. No. 23. pp. 1627-30, 1633-36, 1639-42. English summary (8 lines).

Twelve cases are described in some detail, all occurring in Partinico (Palermo), of which the main features were: sudden onset with malaise, fever 39°-40° C. reaching its maximum in 3-4 days with one or more chills, headache and general pains. A rash, macular or papular, at first disappearing on pressure but later persisting, becoming darker,

almost haemorrhagic, appears on the 4th to 6th day and reaches its acme in 2 to 4 days. The spots are discrete and are first seen on the abdomen and submammary regions, soon becoming general. In some patients there is a diffuse reddening of the pharynx, uvula and tonsils. Delirium and hallucinations occur at the height of the fever, which falls by lysis during the last 3 or 4 days; the average duration is 14 days, the limits being 12 to 17 days. Tache noire was not seen. The Weil Felix was positive in 1 of 6 patients tested, to a titre of 1 in 100. There were no fatalities. The condition corresponds very closely with Marseilles fever.

H. H. S.

RAYBAUD (A.). Comment l'appellerons-nous ? boutonneuse, exanthématique, escharonodulaire. [**The Appellation of Eruptive Fever.**]—*Marseille-Méd.* 1930. June 5. Vol. 67. No. 16. pp. 732-733.

The author agrees that a new name is required for "la maladie de Marseille" but he does not like at all the suggestion of JORGES to call it "fièvre escharo-nodulaire." The eschar or "tache noire" is not invariably present and is also to be found in other diseases, for instance plague and Japanese River fever. The rash too is not nodular; this term nodule should be reserved for larger formations such as in leprosy. He considers that as this fever is identical with that described in Tunis twenty years ago under the name of "fièvre boutonneuse" that name should be adopted.

D. H.

OLMER (D.). A propos d'une dénomination fièvre exanthématique ou fièvre boutonneuse. [**The Appellation of Eruptive Fever.**]—*Presse Méd.* 1930. Aug. 16. Vol. 38. No. 66. p. 1110.

Olmer agrees that the Tunisian nodular fever and eruptive fever are one and the same and suggests the name of nodular exanthematous fever, which he considers better than the Tunisian name. He prefers to drop the term "escharo" as the tache noire is not always present and is now generally considered to be simply the site of the infective tick bite.

D. H.

- i. MAZET (M.). A propos de la fièvre exanthématique du littoral méditerranéen. [**Eruptive Fever of the Mediterranean Littoral.**]—*Marseille-Méd.* 1930. Nov. 25. Vol. 67. No. 24. pp. 287-289.
- ii. GIRAUD-COSTA (Edouard). Un cas d'asthénie cardiaque persistante consécutive à une fièvre exanthématique. [**A Case of Persistent Cardiac Weakness following Eruptive Fever.**]—*Ibid.* p. 289.
- iii. PIERI (Jean) & RAYBAUD (Antoine). Fièvre exanthématique à forme purpurique. [**Purpuric Form of Eruptive Fever.**]—*Ibid.* p. 289.
- iv. AUDIBERT (Victor) & BATTAGLINI. Fièvre exanthématique à début blépharo-conjonctival. [**A Case of Eruptive Fever commencing with Blepharitis.**]—*Ibid.* pp. 290-291.
 - i. The author gives an account of 57 cases of this disease observed by him in the neighbourhood of Nice. In all but two there was a

definite history of association with dogs infested with ticks. Many cases occurred in one area which was infested with rats and the author suggests that these vermin may be intermediaries. The common tick on the dogs was *Ixodes ricinus*. Clinically the cases resembled those met with in Marseilles, but the "tache noire," although carefully looked for, was only found in 20 per cent. In the discussion which followed PIERI pointed out that the "tache noire" was of vital diagnostic importance but probably only appeared when the biting parts of the tick remained in the wound. It was also stated that cases had occurred on board ship when no ticks were present.

ii. A young man of 23 years showed persistent cardiac weakness for 3 months after an attack of fever, characterized by low blood pressure, tachycardia on exertion and dyspnoea with extrasystole but no cardiac murmurs.

iii. In this case, otherwise typical, the rash was definitely purpuric. A "tache noire" was situated on the left thigh.

iv. The case of a woman aged 35 who became suddenly ill with fever, pain in the back and myalgia with severe headache. The following day she complained of itching in the left eye which was reddened; next day there was oedema of the eyelids, ecchymoses, infection of the conjunctivae, pus in the cul de sacs and inflammation of the lymphatics draining the area with swelling of the glands in front of the ear. Examination of the pus did not help in the diagnosis nor did puncture of the glands. But on the third day the typical rash appeared all over the body and the diagnosis was confirmed; owing to the extreme swelling of the eyelids it was not possible to determine the presence of the primary sore on the eye. The fever subsided after 15 days and with it the eye symptoms. The patient had no recollection of being bitten by a tick but stated that a day or two before she was taken ill she had removed some ticks from her dog and crushed them with her fingers; none of the blood had gone into her eye, but she remembered rubbing her eyes with her soiled fingers. There seems, the authors add, little doubt of the diagnosis or of the port of entry of the virus. [A similar case is summarized below, p. 631 in this *Bulletin*.]

D. H.

BLANC (Georges) & CAMINOPETROS (J.). La fièvre boutonneuse en Grèce. [*Eruptive Fever in Greece*.]—*Arch. Inst. Pasteur Hellénique*. 1931. Vol. 2. No. 3. p. 459.

PÉDAROS (D.), CARAGIANOPOULOS (G.) & VALSAMAKI (A.). Observations de cas de fièvre boutonneuse constatés à Volo.—*Ibid.* pp. 460-461.

PIRGIALIS (Apostolos). Deux observations de fièvre boutonneuse faites à Volo.—*Ibid.* pp. 461-464. With 2 charts in text & 1 plate.

Recently a few cases of "fièvre boutonneuse" or eruptive fever have been discovered in Greece. The authors tried to reproduce the disease by inoculation of the tick *R. sanguineus*; about 100 were collected in the environs of Athens, both adults and nymphs, ground up and the fluid injected into six volunteers; after an incubation of 7 to 8 days fever developed in all, lasting 12 to 15 days; in no case, however, was any eruption noted or local reaction at site of injection. Further work is necessary before it is possible to say that this fever was an abortive form of the malady of CONOR. Descriptions of typical examples of

the naturally acquired disease are given ; about 16 in all occurred in the town of Volo. A plate gives a striking reproduction of the rash, in one case showing also a well-marked tache noire.

D. H.

BRUMPT (E.). Transmission de la fièvre exanthématique de Marseille par la tique méridionale du chien (*Rhipicephalus sanguineus*). [Transmission of Eruptive Fever of Marseilles by the Southern Dog Tick.]—*C.R. Acad. Sci.* 1930. Nov. 10. Vol. 191. No. 19. pp. 889-891.

The author inoculated a volunteer subcutaneously with the filtered fluid from 110 crushed *R. sanguineus* ticks which had originally been collected from dogs in Morocco and bred for at least one year on hedgehogs in the laboratory ; neither local nor general reaction followed, which, in the author's view, shows that eruptive fever is not due to a parasite of the tick itself.

A second subject, inoculated with the proceeds of emulsion of 100 ticks raised from nymphs collected from dogs in the Marseilles pound (fourrière) developed a typical attack of fever a few days later, thus showing that the nymphs collected 56 days earlier had passed on the infection to the adult tick.

In view of the seasonal distribution of the disease it is interesting to note that this tick, becoming adult in October, awaits the warmer spring weather before attaching itself to another host. The author discusses the question of the alternative host of the virus, probably the dog, although this tick is found on many other species of domestic animals, as well as the mouse and rat.

D. H.

DURAND (Paul). *Rhipicephalus sanguineus* et virus de la fièvre boutonneuse de Tunisie. [*R. sanguineus* and Virus of Fièvre Boutonneuse of Tunis.]—*C.R. Acad. Sci.* 1931. Apr. 7. Vol. 192. No. 14. pp. 857-859. [2 refs.]

The author refers to the work of CONSEIL and himself and also to that of BRUMPT in Marseilles (see above). The author collected ticks (*R. sanguineus*) from a disused dog kennel in the grounds of the Pasteur Institute, Tunis ; no animals had been there which had been in contact with cases of eruptive fever. On 15th December 150 adult ticks were taken, washed in alcohol, in sublimate solution, again in alcohol and finally in distilled water, and then crushed up in sterile saline and the fluid decanted. Part of this fluid was injected into a patient with disseminated sclerosis and part into two *Macacus* monkeys. On the third day the patient developed fever and on the 4th day of the fever the typical rash appeared spreading all over the body, on the face and on the palms and soles. The two monkeys also developed fever ; both were killed and carefully examined but no signs of any morbid condition could be found.

The patient's serum, tested for the Weil Felix reaction, was negative on December 27th, but on January 3rd was positive in a dilution of 1-50 and on January 11th in 1-100.

Thus it has been shown in Tunis as in Marseilles that the tick *R. sanguineus* apart altogether from human cases of eruptive fever can harbour the virus, which is still active during the cold season of the year.

D. H.

JOYEUX (Ch.) & PIERI (J.). Hibernation du virus de la fièvre exanthématique méditerranéenne. [**Hibernation of the Virus of Eruptive Fever.**—*C.R. Acad. Sci.* 1931. Mar. 16. Vol. 192. No. 11. pp. 705-707.

Eruptive fever is essentially a disease of the warm months. The authors have recently carried out experimental work to discover how the virus is carried over from season to season. They collected in February 1931 two lots of ticks, one lot from the pound (fourrière), the other from the walls of a house where cases of eruptive fever had occurred in the previous summer.

The first lot of ticks, comprising 101 males and 138 females, were rapidly washed in perchloride solution 1-1000, then in distilled water and finally ground up in sterile normal saline, filtered through paper and injected into a patient who was suffering from general paralysis. This man showed a slight rise of temperature on the 8th day but no rash developed. The second lot of ticks, collected from the house, 80 males and 105 females, was first treated with ether and then in the same way as the first lot. The proceeds were then injected into another patient who on the 10th day developed fever which lasted for 8 days and on the third day the typical rash of the disease, somewhat discrete yet characteristic. The authors consider that these experiments show that the virus of the disease remains alive in the tick, *R. sanguineus*, during the cold season, although the fact that only one of the patients showed definite fever and rash might suggest that the virus was of low virulence.

D. H.

CLAUDE (H.) & COSTE (F.). La fièvre exanthématique provoquée et son utilisation pour la pyrétothérapie. [**Experimentally produced Eruptive Fever and its Therapeutic Use.**—*Bull. et Mém. Soc. Méd. Hôpit. de Paris.* 1931. Feb. 9. Year 47. 3rd Ser. No. 4. pp. 188-194. With 6 charts in text.

CONSEIL and DURAND in Tunis in 1930 succeeded in producing a typical attack of the fever in a volunteer by the injection of a mixture of the crushed-up bodies of the tick *R. sanguineus*, but when they attempted to pass on the infection by injection of blood into a second volunteer they failed. BRUMPT in Marseilles also succeeded in producing the fever experimentally (above), and the authors of the present paper succeeded in passing on the infection from his case to another volunteer by means of injection of 10 cc. of blood taken on the 7th day of the disease. It occurred to them that a mild fever such as this which could be passed from man to man by means of inoculation might be usefully employed, like malaria, in the treatment of nervous diseases, but without similar risks and difficulties. This idea was favoured by the fact that the volunteer, employed by BRUMPT, was suffering from dementia praecox and showed considerable clinical improvement after his attack of fever which did not affect him in any other way. However, on attempting to subinoculate in series they found that the experimentally produced disease became milder at each inoculation and after 3 passages was without effect. Moreover, injection of an emulsion of a smaller number of ticks than that employed by BRUMPT produced only a mild attack of fever without the typical eruption. [In two cases it has been reported that the injection of the contents of a single tick into the conjunctiva produced a severe attack of the disease.] The

authors suggest that some method may be found of transmitting the disease in full force and that it might then be employed instead of malaria as a therapeutic measure.

D. H.

MARÇON (L.) & MARÇON (H.). Sur un cas de fièvre exanthématique après inoculation intraoculaire accidentelle du sang d'une tique. [**A Case of Eruptive Fever following Accidental Inoculation of Blood from a Tick into the Conjunctiva.**—*Bull. Soc. Path. Exot.* 1930. Nov. 12. Vol. 23. No. 9. pp. 889-891.

The case was that of a farmer aged 62 years who was engaged in ticking his dog [according to the authorities "deticking" is not good English]; he crushed one fully fed tick between his finger nails and a drop of the extruded fluid lodged in his right eye. The following day he developed an acute conjunctivitis localized specially towards the inner canthus. For the next two or three days he suffered from vague pains in the back and limbs and on the 4th day developed fever. Five days later the typical rash appeared and spread all over the body, and he passed through a severe and typical attack of eruptive fever from which he made a gradual recovery.

The authors look upon the conjunctivitis with chemosis limited to one part of the eye as the initial lesion or ulcer. The Weil Felix reaction was negative; the authors think that this reaction is usually positive in these cases but they were only able to test the blood on one occasion during the height of the fever; in all other respects the case was typical.

D. H.

SUAREZ DE PUGA (L.) & COLOMO DE LA VILLA (G.). Un nuevo caso de fiebre exantematica o enfermedad de Olmer. [**Another Case of Eruptive Fever or Olmer's Disease.**—*Medicina Paises Calidos.* Madrid. 1930. Nov. Vol. 3. No. 6. pp. 527-534. With 1 text fig. French summary.

A typical case of the form of typhus described by OLMER and PIERI but occurring in Guadalajara (Spain). The conjectured source of infection was the ticks found in considerable numbers on a dog in the patient's home.

H. H. S.

LEWTHWAITE (Raymond). **Clinical and Epidemiological Observations on Tropical Typhus in the Federated Malay States.**—*Bull. Inst. Med. Res. Federated Malay States.* 1930. No. 1. 42 pp. With 7 charts & 1 folding fig. [13 refs.]

The work covers the period from January 1927 to April 1929, after the retirement of FLETCHER from Malaya. One hundred and sixty-four cases were observed, 154 of the "rural" type and 10 of the urban. The two series were identical in the clinical picture and could only be separated on serological and epidemiological grounds. The incubation period, so far as could be determined, lay between 11 and 21 days. The onset was abrupt, with fever, shivering and headache. No initial lesion corresponding to the primary ulcer of Japanese River fever could be found. The fever reached a maximum on the 12th day, declining gradually to normal about the 14th day. The pulse was quickened, a rate of 100 to 110 being usual. The maculo-papular rash appeared on the 4th to the 6th day on the chest, abdomen, flanks and limbs, and in some cases on the face. There was in most cases a characteristic mild suffusion of the eyes and the patients had a dulled

yet anxious expression. Definite mental disturbance was present in 33 per cent. of the cases, manifested in the majority by delirium. The fatality rate was 6·7 per cent. All the cases in both series gave a positive Weil Felix reaction. In fatal cases a slight but definite perivascular infiltration of the smaller pre-capillaries of the brain was noted; within their walls were seen minute diplococcal forms lying usually within the swollen endothelial cells; similar diplococcal forms were noted within the large pyramidal cells of the cerebral cortex.

Epidemiology. The two forms of tropical typhus as defined by FLETCHER can be correlated by laboratory tests and by statistics of occupation. These two forms have been styled the "Urban" and the "Rural" or scrub typhus, and can be sharply differentiated by serological tests, the serum of the urban cases agglutinating the W strain of proteus and the serum of the rural cases the K or Kingsbury strain; in only one instance in this series was there any cross agglutination.

It was also noted that practically all the "W" cases were indoor workers whereas the "K" cases occurred amongst the outdoor labourers on the plantation and, as will be shown later, among a certain section of these outdoor people. Little or no evidence could be obtained of any relation between the amount of the rainfall and the number of cases of the disease nor was there any marked seasonal incidence, cases occurring in nearly equal numbers throughout the year.

The first epidemiological factor of interest discovered was that the great majority of the cases of tropical typhus "K" type on the Palm Oil Estate occurred among the Tamil labourers and only one or two cases in Malays or Chinese; on further investigation it was found that the majority of these Tamils were employed on the particular branch of work known as "pruning"; these pruners cut away the old branches and decayed fruit from around the base of the palm tree; very few Malays or Chinese are employed on this work.

The next highest incidence of cases was among the "weeder" who cut down the *alang* (high coarse grass) around the palm tree and also cut a path between the individual palms in a row. It was, however, noted that cases were more numerous among the weeder in relation to their close association with the pruning process; indeed it appeared that in some way or other the unknown vector of the "K" type of tropical typhus finds a nidus in and around the base of the unpruned palm tree and that when this dead growth is hacked away the virus or the vector is scattered on the ground close around the tree. The further away from this source of the disease the workers are employed the fewer become the cases of the disease and it was noted that not a single case of the "K" type occurred among the families of the coolies living in the huts on the estate.

As regards the vector of the disease nothing definite can as yet be stated; 3 cases of *tsutsugamushi* disease had occurred on this same estate and the mite *Trombicula deliensis* was readily found on trapped rats. It is possible that tropical typhus is also transmitted by a mite and it was noted that enormous numbers of mites were present on the decayed palm branches and fruits but much further investigation is required before either the mite or tick is incriminated. It is unlikely that the disease is carried by the head louse since this parasite is more common on the children in the lines than on the coolies in the fields and as already stated all the cases occurred in the field, none in the lines.

D. H.

LEWTHWAITE (Raymond). **Experimental Tropical Typhus in Laboratory Animals.**—*Bull. Inst. Med. Res. Federated Malay States.* 1930. No. 3. 10 pp. With 3 figs. & 15 charts. [9 refs.]

Sixty-two guineapigs were inoculated with blood from patients as early as possible in the disease (usually the 4th to the 6th day); only three gave a febrile reaction. Attempts to demonstrate an "infection inapparente" (NICOLLE) were not successful. A rat inoculated with blood from a patient died on the 11th day without significant rise of temperature. A guineapig inoculated with emulsified brain of this rat developed fever on the 10th day. On the 14th day it was killed, four others were inoculated therefrom; all reacted. The brain of one of these animals, killed on the 3rd day of fever, showed proliferative lesions similar to those described by WOLBACH and others in the brains of guineapigs infected with true typhus.

Blood drawn from sixty-two patients between the 4th and 8th day of fever was inoculated into eighty-seven rats and a rise of temperature occurred in twenty-three. Of a further 184 rats subinoculated thirty-seven gave a febrile reaction. Perivascular infiltration and typhus "nodules" were found in the brain of one rat out of five examined.

D. H.

KUYER (A.). **Tropical Typhus.**—*Geneesk. Tijdschr. v. Nederl.-Indië.* 1931. Feb. 1. Vol. 71. No. 2. pp. 182-188. With 6 charts.

Six reports of cases offering the clinical picture of tropical typhus with a pronounced exanthem. In three of them (2 natives, 1 European) the Weil-Felix reaction was positive, in the other three (also 2 natives and 1 European) it remained negative throughout the disease.

W. J. Bais.

WOLFF (J. W.). Enkele waarnemingen bij mijtekoorts en tropical typhus. [**Observations in Tsutsugamushi Fever and Tropical Typhus.**]—*Geneesk. Tijdschr. v. Nederl.-Indië.* 1931. Jan. 1. Vol. 71. No. 1. pp. 35-45. With 4 charts & 2 plates (1 folding). English summary. [Path. Lab., Medan, Sumatra.]

Author's own English summary:—

"A. The occurrence of a positive Weil-Felix reaction (type Kingsbury) during the course of Tsutsugamushi-disease (Schüffner's pseudotyphus, Kedani). A proteus-X-19-agglutination was performed many times in 50 cases of tsutsugamushi-disease. During the course of the disease it became positive 38 times (Kingsbury-strain), usually in the 2nd or 3rd week.

"B. Described is a case of tropical typhus, six months later followed by a typical attack of Tsutsugamushi-disease. At the end of the tropical typhus the Proteus X19 agglutination (Kingsbury-strain) became positive. At the second admission to the hospital the patient's serum showed a negative Weil-Felix-reaction, which gradually became positive during the course of the second disease.

"C. A guinea-pig, intraperitoneally injected with blood of a patient with tropical typhus, showed a typical weight-curve and a marked scrotal reaction on the 8th day. Four other guineapigs (second passage), injected

intraperitoneally resp. with brain- and tunica-vaginalis-emulsions of the first animal, showed during the course of the infection again a loss of weight and a swollen and red scrotum."

W. J. Bais.

VAN STEENIS (P. B.). Een geval van pseudo-typhus (Schüffner) op Java. Met enkele opmerkingen over de differentieele diagnostiek in de groep der febris exanthematica. [**A Case of Pseudotyphus (Schüffner) in Java. The Differential Diagnosis of Exanthematic Fever.**]—*Nederl. Tijdschr. v. Geneesk.* 1931. Jan. 31. 75th Year. 1st Half. No. 5. pp. 495–502. With 2 text figs. [6 refs.] [Military Med. Lab., Weltevreden.]

The case which forms the text of this dissertation had the following characters :—

A primary ulcer in the groin, with regional adenitis. Fever alternating between 39° C. and 40° C. for 18 days and ending almost by crisis. Conjunctivitis with subconjunctival bleeding, bronchitis, palpable spleen and low blood pressure. Stupor, improving towards the end of the fever. Slight and temporary alteration of the reflexes. A blood picture of normal total leucocytes, no eosinophiles, marked shift to the left and moderate toxic change in leucocytes. Weil-Felix reaction positive to a titre of 1 in 1,600 with the anindologenic Kingsbury strain of proteus, negative with the typical proteus X19. Blood culture and agglutination negative for typhoid. No visible rash, but the patient had a very dark skin.

The typhus group of diseases now comprises many members and the author discusses not only the differential characters of these but also the classifications which have been proposed. He does not consider the classification into louse, mite and tick typhus sufficiently well established for adoption. Most important for diagnosis is the Weil-Felix reaction with various strains of proteus; nor must it be forgotten that co-agglutination with *Bact. typhosum* has frequently been observed in typhus fever. It may be regarded as established that the typical proteus X19 is highly agglutinated in Brill's disease, tropical typhus (shop typhus) and the eruptive fevers of Toulon and Italy, as well as in classical typhus fever, but is not agglutinated in the pseudotyphus of Schüffner, the kedani fever of Japan, Formosa and Malaya, the eruptive fevers of Marseilles and Tunis, and the form of tropical typhus known as scrub typhus. This last type of tropical typhus, however, and pseudotyphus both afford positive agglutination with the Kingsbury strain of proteus. The particular case under discussion is identified as one of pseudotyphus.

W. F. Harvey.

JEWELL (N. P.) & CORMACK (R. P.). **Typhus Fevers, with a Description of the Disease in Kenya.**—*Jl. Trop. Med. & Hyg.* 1930. Oct. 15. Vol. 33. No. 20. pp. 301–305. With 7 charts in text & 2 figs. (1 coloured) on 1 plate. [25 refs.]

The authors give a careful clinical description of a case of this type of fever which is not uncommon in Kenya.

There is a profuse rash which extends to the palms and soles. Usually there is a primary sore, an angry looking mark about the size of a shilling with a small ulcer in the centre, generally ascribed by the patient to an insect bite; lymphatics draining the area may be tender

and the corresponding glands enlarged. Lice can be definitely excluded as vectors. The authors do not think that the primary sore is due to a tick bite and suggest a mite as the vector.

In cases in which the Weil Felix reaction was tested it was positive with X19 and Warsaw strains.

They compare and contrast the typhus-like fevers which have been described in various parts of the world and believe that it will be found that all these fevers are but variations, due to differing climates and vectors, of the mother disease, typhus.

D. H.

NAGAYO (Mataro), TAMIYA (Takeo), MITAMURA (Tokushiro) & SATO (Kiyoshi). **On the Virus of Tsutsugamushi Disease and its Demonstration by a New Method.**—*Japan. Jl. Experim. Med.* 1930. Aug. 20. Vol. 8. No. 4. pp. 309-318. With 5 figs. on 2 plates. [1 ref.] Also in *Trans. Japan. Path. Soc.* 1930. Vol. 20. pp. 556-566. With 5 figs. on 2 plates. [1 ref.] [Govt. Inst. for Infectious Diseases, Tokyo.]

The authors have described an organism of the *Rickettsia* group as the virus of tsutsugamushi disease [this *Bulletin*, Vol. 23, p. 362]; this organism was found in the tissues of patients and of inoculated animals. The present paper deals with a new method of demonstrating the organism by means of inoculation of infective material (blood of human cases and ground-up materials from experimental animals) into the anterior chamber of the eye of the rabbit. Characteristic symptoms appear locally after an incubation period of 4 to 8 days.

Material taken from these lesions proved infective for other animals either by intraocular injection or by subcutaneous injection of monkeys. The most highly infective tissue proved to be the layer of endothelial cells of Descemet's membrane and on making smear preparations from this area enormous masses of *Rickettsia*-like bodies were demonstrated.

Inoculation of typhus material into the rabbit's eye produces somewhat similar changes and *Rickettsia* can be seen here also, but differing in appearance and distribution from the tsutsugamushi organism.

Recovery from the lesion took place with subsequent immunity to the homologous virus but none to the typhus and vice versa.

The name *Rickettsia orientalis* is proposed for the organism.

D. H.

SINCLAIR (B. A.). **A Possible Case of Tsutsugamushi or Japanese River Fever occurring in the Mandated Territory of New Guinea.**—*Med. Jl. Australia.* 1930. Dec. 6. 17th Year. Vol. 2. No. 23. p. 759.

A case of high continued fever with a macular rash which appeared at the end of the first week of fever. A small slightly-swollen red irritable patch was noted at the commencement of the illness at the back of the right knee; this developed into a sore with a dark brown scab ("tache noire"). There was no history of a bite and no ticks were found on the patient. The typhoid state was present. The Widal reaction tested on the 18th day was negative to typhoid and paratyphoid. Blood culture negative. The Weil Felix reaction tested on the 30th day was also negative.

D. H.

PIJPER (Adrianus) & DAU (Helen). **The Transmissibility of Tick-Bite Fever Virus to Guinea-Pigs.**—*Brit. Jl. Experim. Path.* 1930. Oct. Vol. 11. No. 5. pp. 287–290. With 1 text fig. [8 refs.]

The authors injected the blood of cases of African tick-bite fever into guineapigs and noted that such injections were invariably followed by a definite, but not marked, rise of temperature which continued for several days. They were able also to pass on infection by passage to other guineapigs, the later injections giving a more pronounced reaction; blood and brain tissue was employed. The temperature reactions in the tick-bite fever guineapigs resemble closely the reaction in guineapigs inoculated with material from cases of Rocky Mountain fever; for this reason it is suggested that tick-bite fever is caused by a living virus of the *Rickettsia* class.

D. H.

CANNAVÒ (L.). Sulla febbre esantematica mediterranea — *Riforma Med.* 1931. Apr. 6. Vol 47 No. 14. pp. 517–519. [General Med Clinic, Univ., Palermo]

KALA AZAR.

CHINA MEDICAL JOURNAL. 1931. Jan. Vol. 45. No. 1. pp. 1-42.
With 2 plates & 1 map. [2 refs.] **Symposium on Kala-Azar.**
[8 papers.]

- i. **Neostibosan in the Treatment of Kala-Azar. Notes on the Treatment of 87 Cases** [STRUTHERS (E. B.)]. pp. 1-17. With 5 figs. on 2 plates. [2 refs.]

The paper gives an account of eighty-seven cases of kala azar treated with neostibosan. They represented all types of the disease, and in every case diagnosis was made by liver and spleen puncture. The ages varied from three to thirty-six years. The initial adult dose was 0.1 gm. intravenously. Subsequent doses varied from 0.2 to 0.3 gm. according to the weight and condition of the patient. In some cases injections were given daily, and in others every second day. If there were any symptoms which might be attributed to the drug, the interval between the doses was increased and the next dose reduced. For an adult of 100 to 120 lbs. weight a total of 2.6 to 3.0 gm. were given. In children both intravenous and intramuscular injections were given. In no case was there any local reaction from the latter. The initial dose was 0.05 gm. followed by 0.2 gm. on alternate days, till a total of 1.6 to 2 gm. had been given. In India NAPIER treated a series of adults with daily injections of 0.3 gm. This treatment did not appear to be tolerated so well by the Chinese patients as by the Indian. Though in some cases the treatment was completed in under sixteen days it seemed better as a rule not to push the drug until toxic symptoms appeared, but to give doses well within the tolerance of the patient even though this involved one or two weeks longer treatment. Of the eighty-seven cases thirty-seven have not been traced since treatment was completed; three have died; while forty-seven are still well, twenty-eight of them six or nine months after discharge.

- ii. **Kala-Azar treated with Neostibosan. Report of a Series of Cases** [BETHELL (S. E.)]. pp. 17-20.

Records are given of the first eleven cases of kala azar treated with neostibosan. They varied in age from four to nineteen years. In two of the cases injections were given on alternate days, and in the others daily. The initial dose varied from 0.1 to 0.2 gm., the maximum dose from 0.15 to 0.3 gm., and the total quantity of drug given from 1.4 to 2.65 gm. according to the age of the patient. Four of the patients have been re-examined two to four months after treatment and were apparently cured. It seems likely that the cases not seen since discharge are also cured. There was no death in the series.

- iii. **Table of Treatment of Kala-Azar, from Nanhsuchow, Anhwei** [TURNER (William H.), Jr.]. pp. 21-23.

In a series of twenty-seven cases of kala azar treated with neostibosan the author expresses himself as well pleased with the results. In two of the cases followed by death he is of opinion that treatment should have been delayed until further observation had been made. The others made satisfactory progress and two of them were known to be

well five and eight months later. The ages of the patients varied from five to forty-four years, the maximum dose of drug from 0.07 to 0.3 gm. and the total quantity from 0.27 to 3.17 gm.

iv. **Neostibosan in the Treatment of Kala-Azar** [MORGAN (L. S.)]. pp. 24-27.

Having at his hospital continuously from one hundred to one hundred and sixty cases of kala azar under treatment, in order to test the action of neostibosan, the author chose the most advanced ten cases. The result was so entirely satisfactory that it was decided to use this drug exclusively for the treatment of the disease. Since the test several hundred cases have been treated and the author proclaims the change to neostibosan a great improvement. For the first ten cases the average total dose was 6.5 gm., the average number of injections 22.4, and the average duration of treatment 49.9 days.

v. **Kala Azar Work in the Tsingkiangpu General Hospital, Tsingkiangpu, Ku. Preliminary Report** [WOODS (James B.), Sr. & BELL (L. Nelson)]. pp. 27-30.

This report is based on 2,539 cases of kala azar treated during the first eleven months of 1930. Of these 1,097 were in-patients, while the remainder were quartered near the hospital and came daily for their injections. With few exceptions all were treated with neostibosan. For an adult of 120 lbs. weight and in good condition the initial dose was 0.1 gm. This was increased by increments of 0.05 gm. till a maximum of 0.3 gm. was reached for in-patients and 0.25 for out-patients. For children the dosage was worked out on a corresponding basis. The rule has been to give injections on alternate days, up to a total of 3 or 3.25 gm. Of the 2,539 cases 1,914 are given as cured, 473 as still under treatment, 43 as having died, and 109 as having left hospital before treatment was completed.

vi. **Diagnosis of Visceral Leishmaniasis** [YATES (T. M.)]. pp. 31-35.

In discussing the diagnosis of kala azar the author emphasizes the value of liver puncture which has given a positive result in the last hundred cases, namely 95 at a first puncture and 5 at a second. He also finds that Ray's test gives a high percentage of positive findings.

vii. **Kala Azar as a Clinic Disease** [McFADYEN (A. A.)]. pp. 35-40.

Owing to the lack of hospital accommodation cases of kala azar were treated as out-patients. During the past six years there have been 2,040 of these, of whom 1,934 were treated with tartar emetic and 104 with neostibosan. For diagnosis reliance had to be placed on the clinical signs and the serum globulin reaction. Of the cases treated with tartar emetic the known cures numbered 833, and the known deaths 254. Of the remaining 847 the result is uncertain, but it is estimated that at least half are still living. Of the 104 treated with neostibosan 12 died, several of them as a result of attempts to press the treatment with the object of shortening the course. The advantages and disadvantages of treating cases as out-patients are discussed. It is thought the provision of hostels for the patients would be a solution of the problem of dealing with the large number of cases for which hospital accommodation is not available.

viii. **A Few Facts about the Distribution of Kala Azar in Manchuria**
[TAYLOR (H. W. Y.)]. pp. 40-42. With 1 map in text.

In 1917 leishmania were found by spleen puncture of a patient in Mukden men's Hospital. Since then there has been a constant stream of cases which have risen from four or five to nine or ten a year. Most came from the Liaoyang district, south of Mukden. From the area south of Liaoyang Dr. PHILLIPS of Newchwang sees from ten to fifteen cases a year. It appears certain that kala azar is widely scattered over the south-west part of Southern Manchuria.

C. M. Wenyon.

CHINA MEDICAL JOURNAL. 1931. Feb. Vol. 45. No. 2. pp. 146-147. **Kala-Azar in China. A Brief Addendum to the Symposium on Kala-Azar published in the January Journal.**

Dr. ROBERTSON confirms Dr. TAYLOR's statements regarding the incidence of kala azar in Manchuria, south of Mukden, while Dr. STURTON mentions cases of possible kala azar which have been reported to him from Kiangshan, on the borders of Chekiang and Kiangsi, a district which is much further south than any known endemic area of the disease.

C. M. W.

ADLER (S.) & THEODOR (O.). **The Exit of *Leishmania infantum* from the Proboscis of *Phlebotomus perniciosus*.** [Correspondence.]—*Nature*. 1930. Dec. 6. Vol. 126. No. 3188. p. 883.

When the proboscis of a sandfly is inserted into a capillary tube containing a solution of citrate of soda, the mouth parts may exhibit all the movements of piercing with or without ingestion of fluid. Employing this technique (Hertig's method) with fifteen *Phlebotomus perniciosus* which had ingested leishmania five to thirteen days before, it was found that in six instances the fluid in which the proboscis had been inserted contained flagellates, which varied in number from one to hundreds. In all cases, however, the number was small compared with that of the flagellates found in the flies on dissection. The forms recovered in the citrate solution were sluggish or quite motionless, while those seen on dissection in the midgut or oesophagus were very active. From these experiments it is evident that the flagellate forms of leishmania are able to leave the proboscis of *P. perniciosus* during the act of biting, a fact which the authors suggest may explain the relative frequency of Mediterranean kala azar in infants under twelve months of age.

C. M. W.

NATURE. 1931. Feb. 28. p. 308. **Transmission of *Leishmania donovani*** [SHORTT].

The notice states that a telegram had been received from Lt.-Col. SHORTT giving the information that a generalized infection with *Leishmania donovani* occurred in a hamster on which artificially infected *Phlebotomus argentipes* had been fed repeatedly during the course of twelve months. The infection was discovered seventeen months

after the commencement of the experiment. There are no further details but it appears evident that after many failures the Kala Azar Commission in Assam has at last succeeded in transmitting kala azar to the hamster by the bites of sandflies.

C. M. W.

ADLER (S.) & THEODOR (O.). **A Study of the Sandfly Population in Endemic Foci of Infantile Kala-Azar in Italy.**—*Bull. Entom. Res.* 1931. Mar. Vol. 22. Pt. 1. pp. 105–113. With 2 text figs. & 4 figs. on 2 plates. [9 refs.] [Microbiol. Inst., Hebrew Univ., Jerusalem.]

From the middle of July to the beginning of September, 1929, sandflies were collected in the neighbourhoods of Naples and Catania, the two most important centres of infantile kala azar in Italy. In Naples 9.5 per cent. and in Catania 13.3 per cent. of all cases are in infants under the age of twelve months. In both places the canine disease also exists, but the true relationship of this to the human disease has not been determined. Destruction of street dogs in Catania has had no influence on the incidence of human kala azar. Of the five species of sandfly found, 1,266 *Phlebotomus papatasi*, 270 *P. perniciosus*, 5 *P. sergenti*, 2 *P. vesuvianus* sp. n., and 4 *P. parroti* var. *italicus*, var. n. were dissected but none was found infected with leishmania. By allowing it to feed through a membrane on cultures of the parasites of Italian and Indian kala azar *P. papatasi* was readily infected. Though the Indian strain gave a higher infection rate, the infections produced by the Italian strain were more intense and showed less tendency to die out than those produced by the Indian strain. It was not possible to induce *P. perniciosus* to feed through a membrane, but the variety from Palestine—*P. perniciosus* var. *tobbi*—was fed by Hertig's method through capillary tubes on cultures of two Mediterranean strains which had produced a low infection rate in *P. papatasi*. Both strains produced infections which even when slight ascended to the cardia.

C. M. W.

BLANC (Georges) & CAMINOPETROS (J.). La transmission du kala-azar méditerranéen par une tique. [**Transmission of Mediterranean K.A. by a Tick.**]—*C.R. Acad. Sci.* 1930. Dec. 8. Vol. 191. No. 23. pp. 1162–1164. [1 ref.]

The authors have shown that leishmania will survive a number of days in the larvae and nymphs of *Rhipicephalus sanguineus*. Larvae were allowed to gorge themselves on an experimentally infected spermophile (*Citellus citillus*). They were collected and on the following day 200 were emulsified and injected into a healthy spermophile which was found to be infected about two months later. A similar experiment with nymphs which had fed on a naturally infected dog also gave a positive result. Furthermore larvae taken from an infected spermophile were kept for thirteen days till they had become nymphs, while nymphs from an infected dog were kept for fifteen days till they had become adults. The nymphs and adults were then emulsified and injected into healthy spermophiles. In both cases infection occurred. Though the experiments merely prove that leishmania will survive

for about two weeks in the tick as they are known to do for longer periods in the bed bug, the conclusion is reached that the tick should be regarded as the transmitting agent of Mediterranean kala azar.

C. M. W.

JEMMA (Rocco). La leishmaniosi dei bambini. [**Infantile Kala Azar.**]
—*Riforma Med.* 1930. Dec. 8. Vol. 46. No. 49. pp. 1939-1943.

This is a general account of infantile kala azar of which the author has had extensive experience at his clinic in Naples. He distinguishes an acute form of the disease of 35 to 40 days' duration, a sub-acute form lasting 5 to 12 months and a chronic form, less frequently seen, which runs a course with periods of remission and exacerbation. As regards treatment he still adheres to the intravenous injection of tartar emetic, which he claims gives as good results as the more recently introduced organic preparations.

C. M. W.

KHAW (O. K.). **Transmission of Kala-Azar to Hamsters** (*Cricetulus griseus*) **by the Oral Route.**—*Proc. Soc. Experim. Biol. & Med.* 1930. Dec. Vol. 28. No. 3. pp. 231-234. [8 refs.] [Peiping Union Med. College, Peking.]

Thirty normal hamsters were each fed by pipette 0.5 cc. of a thick saline emulsion of the ground spleen of a heavily infected hamster. The animals were killed and examined by the smear and culture method at varying intervals after feeding or were allowed to die naturally. A positive culture was first obtained from the spleen of an animal killed seven days after feeding. A number of the animals had been examined with negative results before the seventh day. Excluding these and one that was too decomposed for examination a total of twelve out of fourteen became infected.

C. M. W.

CHODOUKINE (N. I.), SOPHIEW (M. S.) & CHEWTCHEENKO (F. I.). Sur la possibilité de la contagion par la voie digestive et par contact dans les cas du kala-azar. [**Possibility of Transmission of K.A. by Alimentary Tract or by Contact.**]—*Pensée Méd. d'Usbéquistan et de Turquéménistan.* Tashkent. 1930. Aug.-Sept. No. 11-12. pp. 62-65. [In Russian.]

Experiments were conducted and observations made with the view of determining the possibility of transmission of kala azar via the alimentary tract and through contact. In one experiment two "clean" pups were fed on the fresh spleen of a dog infected with kala azar, the infecting material having been placed into gelatine capsules and introduced directly into the oesophagus. In another experiment scrapings of the same spleen were introduced into the conjunctival sacs of two other pups. The animals were sacrificed about 5 months later, material from their spleen and bone marrow was inoculated into NNN medium, and smears were made. The results were in all cases negative. It was further observed that healthy pups kept in close contact with infected dogs during the winter months (when sandflies are absent) remained

uninfected, whereas in summer they readily acquired an infection under similar conditions. From the identity of the canine and human parasites it is inferred that man is likewise incapable of acquiring infection through ingestion of or from contact with infective material.

C. A. Hoare.

CHUNG (Huei-lan) & KUROTCHKIN (T. J.). **The Susceptibility of the Squirrel (*Sciurotamias davidianus*) to Kala-Azar.**—*Nat. Med. J. China*. 1930. Oct. Vol. 16. No. 5. pp. 616-624. [13 refs.] [Peiping Union Med. College, Peking.]

By inoculating the squirrel (*Sciurotamias davidianus*) intraperitoneally with leishmania from the spleens of infected hamsters or with cultural forms of the organism, the authors have shown that it is susceptible. The infection, though associated with splenomegaly, leucopenia and anaemia, is of a relatively benign nature, the animals showing a marked tendency to spontaneous recovery. Infection is produced more readily with leishmania from the spleen of the hamster than with cultural forms.

C. M. W.

OWEN (D. U.). **A Case of Kala-Azar from West Africa.**—*Ann. Trop. Med. & Parasit.* 1930. Dec. 18. Vol. 24. No. 4. p. 601.

As kala azar is so uncommon in West Africa the author has recorded the following case. A missionary 23 years of age set out from Kano on a six months' trek passing through Zinder, Ingal, Tanout, Tahoua, Agades, Andaras, Iferuane, Dogondouchi, Dosso, Niamey, Say, Gaya, Llo, Yelwa, Jebba and Minna. When he arrived at the last-named place he had fever, for which he was treated unsuccessfully in hospital for five weeks, after which he was sent to England for treatment at the Liverpool School of Tropical Medicine. He was then in a very depressed state, showed a scanty blood infection with *Plasmodium malariae* and leishmania on spleen puncture. He died, in spite of treatment, in March 1928.

C. M. W.

BRAHMACHARI (Upendranath) in collaboration with SEN (Parimal Bikas) & BANERJEA (Radhakrishna). **Studies in Kala-Azar and Chemotherapy of Antimony. Part IV. Further Observations on the Antimony-laden Cells of Spleen after Intravenous Injection of Metallic Antimony in a State of Fine Suspension in Experimental Animals.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1930. Nov. 25. Vol. 24. No. 3. pp. 351-352. With 1 text fig. [College of Science, Univ., & Brahmachari Research Inst., Calcutta.]

The authors report that when finely divided antimony is injected intravenously into healthy mice the particles in the spleen are taken up by cells which are similar to those which they have previously shown take up particles in mice experimentally infected with *Leishmania donovani*. In healthy mice there are more particles remaining outside the cells than in infected mice, a result of the marked increase in number and size of these cells in infected animals.

C. M. W. i

BRAHMACHARI (Upendranath) in collaboration with **BANERJEA** (Radhakrishna). **Studies in Kala-Azar and Chemotherapy of Antimony. Part V. The Treatment of Resistant Cases of Dermal Leishmanoid.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1931. Mar. 13. Vol. 24. No. 5. pp. 565-567. [8 refs.] [Brahmachari Research Inst., Calcutta.]

In an attempt to shorten the period of treatment of cases of dermal leishmanoid in six cases intravenous injections of urea stibamine were combined with local inunction of the skin lesions with metallic antimony. The results so far obtained appear to be much more satisfactory than those following intravenous treatment alone.

C. M. W.

CHUNG (H. L.) & **REIMANN** (Hobart A.). **Antibody Formation in Kala-Azar.**—*Arch. Intern. Med.* 1930. Nov. Vol. 46. No. 5. pp. 782-786. With 2 charts in text. [4 refs.] [Peiping Union Med. College, Peking.]

Nine cases of kala azar, two cases of chronic myelogenous leukaemia and six healthy young adults were given at five-day intervals three doses of triple typhoid vaccine. Agglutination tests were performed with the sera before vaccination, after the second vaccination, and then at approximately ten-day intervals during two months or longer. Though specific agglutinins appeared in all cases they were much weaker in titre and disappeared much sooner in the kala azar and leukaemia cases than in the normal controls. In a patient who developed typical typhoid fever during kala azar, agglutinins did not appear as late as twenty-seven days after the onset. In cases which have recovered from kala azar agglutinins are formed as in normal individuals. It is thought that these results indicate a relationship between the haematopoietic system, which is profoundly affected in these diseases, and the formation of immune bodies.

C. M. W.

LAURINSICH (Alessandro). **Ricerche sull'agglutinazione di varie specie di Leishmania.** [**Researches on the Agglutination of Leishmania Species.**]—*Pediatria.* 1931. Apr. 1. Vol. 39. No. 7. pp. 345-350. [9 refs.] [Inst. of Clin. Pediatrics, Univ., Naples.]

Experimenting with the sera of rabbits injected with cultural forms of *Leishmania donovani*, *L. infantum*, *L. tropica* and *L. brasiliensis*, the author finds that the *L. donovani* serum agglutinated this organism as well as *L. infantum*, while the *L. infantum* serum agglutinated *L. infantum* and *L. donovani*. The sera of the other two parasites were strictly specific. The author concludes that *L. donovani* and *L. infantum* are identical or closely related.

C. M. W.

FRANCHINI (Giuseppe) & **PIRAMI** (Ester). **Ricerche sierologiche sulle leishmaniosi, sui flagellati degli insetti e sull'Herpetomonas del gecko (*H. tarentolae*).** [**Serological Researches on Leishmaniasis and Insect Flagellates.**]—*Arch. Ital. Sci. Med. Colon.* 1930. Nov. 1. Vol. 11. No. 11. pp. 666-669. [10 refs.] English summary (4 lines). [Lab. of Colonial Path., Bologna.]

By inoculating rabbits with cultures of *Leishmania donovani*, *L. tropica*, *L. brasiliensis* and *L. tarentolae*, as also various insect

flagellates (*Herpetomonas muscidarum*, *H. parva*, *H. lygoeorum*, *H. oncopelti*), sera were obtained which it is stated were specific in that they agglutinated only the homologous organisms.

C. M. W.

ZDRODOWSKI (P.) & WOSKRESSENSKI (B.). Essai du sérodiagnostic et de l'analyse sérologique de la leishmaniose viscérale humaine et canine au moyen de la réaction de la fixation de l'alexine. [**Complement Fixation in the Diagnosis of Human and Canine Leishmaniasis.**]—*Bull. Soc. Path. Exot.* 1930. Dec. 10. Vol. 23. No. 10. pp. 1028-1043. [1 ref.] [Microbiol. Inst., Baku.]

— in collaboration with VOSKRESSENSKI (B.). Sur la sérologie comparée du groupe de leishmanies d'origine humaine et canine. [**Relation between Human and Canine Leishmania as shown by Serological Tests.**]—*Ibid.* 1931. Jan. 14. Vol. 24. No. 1. pp. 37-41. [1 ref.] [Inst. of Experim. Med., Leningrad.]

In the first of these papers the authors state that contrary to previous observations they have demonstrated beyond doubt that specific fixation of complement may be obtained in the case of human infections with *Leishmania donovani* and *Leishmania tropica*. The antigen employed was prepared from cultures of the organisms. As regards canine leishmaniasis the results were less defined, and the conclusion was reached that several serological strains of leishmania occurred in dogs.

In the second paper further work, particularly with canine infections, is described. It is clear that in dogs at least three types of leishmania occur—two which correspond with the two human parasites, and one which appears to be distinct in that it gives the reaction with both parasites.

C. M. W.

BALACHEWA (M. T.). **The Rieckenberg Reaction in Leishmaniasis.**—*Pensée Méd. d'Usbéquistan et de Turquéménistan.* Tashkent. 1930. Nov.-Dec. Vol. 5. No. 2-3. pp. 48-53. [9 refs.] [In Russian.]

Rieckenberg's reaction or the adhesion phenomenon was applied to dogs in Tashkent with spontaneous infections of leishmaniasis. Cultures of *Leishmania donovani* and *L. tropica*, both of the human and canine varieties, were employed in the tests. The reaction was positive with the serum of 11 dogs with cutaneous leishmaniasis and with that of 5 with the visceral form when tested against the homologous parasite. The cross-tests with canine sera against human parasites were, however, unsatisfactory; in 6 cases the results were positive, in 10 uncertain. The reaction was positive in 7 dogs suffering from cutaneous leishmaniasis when tested after a year's interval.

C. A. Hoare.

SEMENZA (Carlo). La leishmaniosi viscerale nel suo aspetto epidemiologico, clinico e terapeutico. [**Kala Azar, Epidemiological, Clinical and Treatment.**]—*Haematologica.* II. Rec. 1930. Vol. 1. No. 5/6. pp. 211-222. [24 refs.]

A general article on kala azar giving no new information.

C. M. W.

LO PRESTI-SEMINERIO (Francesco). Sulla probabile trasmissione della leishmaniosi infantile. [**Transmission of Infantile Kala Azar.**]—*Riforma Med.* 1931. Mar. 16. Vol. 47. No. 11. pp. 433-434.

A discussion of the problem of transmission of infantile kala azar resulting in the conclusion that some blood-sucking insect is involved.

C. M. W.

BELTUKOW (N.). **A Case of Kala Azar in a Red-Army Soldier.**—*Pensée Méd. d'Usbéquistan et de Turquémistan.* Tashkent. 1930. Nov.-Dec. Vol. 5. No. 2-3. pp. 108-111. [9 refs.] [In Russian.]

The total number of adult cases of kala azar observed in the Central Asiatic provinces of Russia is very small, amounting to not more than about one score. In this paper is recorded a case in a soldier of the Red Army.

C. A. Hoare.

SEMENZA (C.). Sopra un caso di kala-azar diagnosticato a Milano. [**Case of Kala Azar diagnosed at Milan.**]—*Riforma Med.* 1931. Mar. 23. Vol. 47. No. 12. pp. 447-450 [Princess Jolanda Hosp. School, Italian Red Cross, Milan.]

Description of a case of kala azar in a child twelve years of age. The disease was apparently contracted in Milan though short visits to Genoa and Rome had been made during the six months preceding the commencement of the illness in July 1930.

C. M. W.

MATA MERCHÁN (Mariano) & MAÍTA MERCHÁN (Joaquín). Dos casos de kala-azar infantil en la provincia de Badajoz [**Two Cases of Infantile Kala Azar in the Province of Badajoz.**]—*Medicina Países Cálidos.* Madrid. 1931. Jan. Vol. 4. No. 1. pp. 44-45.

Description of a case of kala azar in a child six years of age from the Province of Badajoz in Spain, and the mention of a second case from the same Province in a child three years of age.

C. M. W.

PEREFÉREZ (F.). Dos casos interesantes de kala-azar infantil en la provincia de Alicante. [**Two Cases of K.A. in Alicante.**]—*Medicina Países Cálidos.* Madrid. 1931. Mar. Vol. 4. No. 2. pp. 123-125. With 1 text fig.

A brief description of two cases of infantile kala azar.

C. M. W.

GASPERINI (Carlo Gasperino). Sulla coltura dal sangue periferico nel kala-azar. [**Culture of Peripheral Blood in Kala Azar.**]—*Ann. d'Igiene.* 1930. Dec. Vol. 40. No. 12. pp. 910-913.

Blood from five cases of infantile kala azar inoculated into N.N.N. medium gave in all cases after two weeks cultures of *Leishmania donovani*. The value of the culture method in diagnosis is emphasized.

C. M. W.

LUIGGI (F. J.). Le Souf, pays de leishmaniose cutanée. [**Dermal Leishmaniasis in the Souf.**]—*Arch. Inst. Pasteur d'Algérie.* 1930. Mar. Vol. 8. No. 1. pp. 85-89. With 1 map in text & 1 plate. [4 refs.] [Pasteur Inst. of Algeria, Algiers.]

The author, having come across about a dozen cases which appeared to be oriental sore in the Souf district of Algeria near the Tunisian

border of the Sahara, was able to confirm the diagnosis by the finding of leishmania in three. The disease is not common in the district, which nevertheless is an endemic focus from which the first cases were recorded by BAQUÉ and BIDAULT in 1921 and 1923 [see this *Bulletin*, Vol. 18, p. 241 ; Vol. 20, p. 574].

C. M. W.

PHOTINOS (Panagiotis B.). Formes atypiques infiltrées en nappes, de leishmaniose cutanée (bouton d'Orient). [**Atypical Forms of Dermal Leishmaniasis.**—*Ann. Dermat. et Syphil.* 1930. Nov. 7th Ser. Vol. 1. No. 11. pp. 1184-1187. With 2 figs. [1 ref.]

The author has already called attention to various atypical forms of oriental sore. He now describes and illustrates two cases in which the lesions, instead of being of the usual raised furunculous, ulcerative or nodular type, were in the form of flat infiltrations, resembling papular syphilides or certain types of lupus. In such cases errors in diagnosis are easily made.

C. M. W.

DA CUNHA (Aristides Marques). Diagnostico da leishmanios etegumentar pelo desvio do complemento e intra-dermo reacção. [**Diagnosis of Dermal Leishmaniasis by Complement Deviation and Intradermal Reaction.**—*Rev. Med.-Cirurg. do Brasil.* 1931. Feb. Vol. 39 No. 2. pp. 37-39.

As observations were in progress on the possibility of employing an antigen prepared from *Trypanosoma equiperdum* for obtaining fixation of complement as an aid to diagnosis of Chagas' disease it was thought advisable to test the antigen on cases of leishmania infection. MUNIZ had shown that with this antigen the sera from two such cases of five and seven years' duration had given positive results while sera from two cases with histories of two months had given negative results. The antigen was prepared from washed trypanosomes from the blood of experimentally infected rats. Two cases of leishmaniasis with histories of ten and six months gave a negative result, while four cases, two of which had histories of two and five years, were positive. Two cases of malaria were negative, while of two apparently healthy persons one was negative and the other positive. As the last mentioned case came from a focus of Chagas' disease it is thought possible that it was a case of trypanosomiasis. With the possibility of obtaining a skin reaction antigen was injected intradermally into the six cases and into controls. The controls gave no reaction while all six cases of leishmaniasis gave a reaction of varying intensity. This was evident in 24 to 48 hours and was local, general and focal. The local reaction took the form of a painful erythematous papule, the general reaction was represented by an elevation of temperature, while the focal reaction consisted of congestion around the cutaneous lesions.

C. M. W.

GUPTA (B. M. Das). **The Treatment of Oriental Sore with Berberine Acid Sulphate.**—*Indian Med. Gaz.* 1930. Dec. Vol. 65. No. 12. pp. 683-685. With 5 text figs. [2 refs.]

The author reports that during 1928-29 six cases of oriental sore were successfully treated with a 2 per cent. solution of berberine acid

sulphate, two to four injections being required to effect a cure. With a view to discovering if the disease could be cured by one intensive dose a case with four lesions was selected. The lesions, in all of which leishmania were demonstrated, comprised an ulcer about one and a quarter inches in diameter on the wrist and three nodules on other parts of the body. One of the nodules and the tissue round it was infiltrated on all sides by an injection of 3 cc. of Orisol (Messrs. May and Baker's 2 per cent. solution of berberine acid sulphate in ampoules), another nodule with 1 cc., and the two other lesions with 3 cc. From the first of these lesions pieces of tissue were removed before, forty-five hours after, and four days after the infiltration. Sections were cut. Many parasites were present in the piece removed first, considerably less in the second piece and practically none in the third. To destroy the few remaining parasites in this lesion a second infiltration with 2 cc. was given. All four lesions healed very rapidly. The author has seen thirty-three cases of oriental sore, all of them dealt with by infiltration with the drug. A 2 per cent. solution of the acid salt must be used and the hyperaemic area round the sore as well as the sore itself must be infiltrated. If 2 cc. to 3 cc. are injected into several points the majority of sores can be cured by a single injection.

C. M. W.

LENFELD (Jan). Příspěvek ke klinické diagnostice spontánní leishmaniosy psů. Contribution au diagnostic clinique de leishmaniose canine spontanée. [**Diagnosis of Canine Leishmaniasis.**—Reprinted from *Věstník I. sjezdu čsl. zvěrolékařů*. [Proceedings of the I. Congress of Czechoslovakian Veterinarians held at Brunn in 1927]. 15 pp. With 7 figs. on 6 plates. [20 refs.] [In Czechoslovakian. French and German summaries.*]

——. [In Czechoslovakian and French.] Mikroskopický nález při akutní spontánní leishmaniose psa. Recherche microscopique de la leishmaniose canine spontanée d'une marche aiguë.—*Klinické Spisy Vysoké školy Zvěrolékařské Brno, Československo. Publications Cliniques de l'Ecole des Hautes Etudes Vétérinaires Brno. Tchécoslovaquie*. 1929. Vol. 7. No. 4. pp. 169–178. With 7 text figs. [French summary.]

On a journey by ship from Hongkong to Trieste in 1920 three of a number of dogs on board became ill. The symptoms are described in detail. Two of the dogs died, while one recovered in three days. It was possible to perform a post-mortem examination on one of the dogs, a young one purchased in Hongkong. Smears of the various organs were made and tissues were fixed in formalin. The films were eventually stained and sections of the tissues cut. In both smears and sections it is stated that numerous leishmania occurred. It is concluded that not only this dog but the two others suffered from acute leishmaniasis, from which one recovered after three days' illness. A further conclusion is that canine leishmaniasis is endemic in Hongkong.

[Being aware of the fact that kala azar in China has not been recorded south of the Yangtse river, the reviewer requested the author to send him preparations. He very kindly forwarded excellently stained smears of the spleen, bone marrow and heart blood, as also fixed tissues. Sections of the spleen were made but neither in these nor in the smears could the reviewer discover any evidence of leishmania infection.]

C. M. W.

* This abstract was prepared from a typewritten English translation sent by the author to the reviewer privately, as the French and German summaries at end of the printed paper give notes on canine leishmaniasis in general but do not deal with the actual cases under report.

SESHADRINATHAN (N.). **Report of a Second Case of "Dermal Leishmanoid" from Madras.**—*Indian Med. Gaz.* 1930. Oct. Vol. 65. No. 10, pp. 567–568. With 2 text figs. [Med. College, Madras.]

Description of another case of post-kala-azar dermal leishmaniasis from Madras. The patient had been discharged as cured from kala azar about a year before the cutaneous lesions made their appearance.

C. M. W.

CANAAN (T.). Zur Epidemiologie der Orientbeule in Palästina. [**Epidemiology of Oriental Sore in Palestine.**]—*Dermat. Woch.* 1930. Dec. 6. Vol. 91. No. 49. pp. 1779–1781. [10 refs.]

In a previous paper (this *Bulletin*, Vol. 27, p. 99) the author stated that since the War oriental sore in Palestine, which had been limited to Jericho, had spread to other centres. In the present paper further evidence of this is produced, and the various factors which may account for it are discussed.

C. M. W.

JOANNIDÈS (Nicolas Z.). Neostibosan bei Leishmaniosis. [**Neostibosan in Leishmaniasis.**]—*Dermat. Woch.* 1931. Feb. 21. Vol. 92. No. 8. p. 280. With 1 text fig. [Dr. Nicolas Joannidès' Skin Clinic, Cairo.]

The case of a woman, thirty-four years of age, who had oriental sore in the form of two lesions on the leg. A cure was brought about in twenty-two days by combining local treatment with eight intramuscular injections of neostibosan and twelve injections of iodisan.

C. M. W.

FOX (Howard). **American Leishmaniasis. Report of Cases observed in Brazil.**—*Arch. Dermat. & Syph.* 1931. Mar. Vol. 23. No. 3. pp. 480–501. With 13 text figs. [35 refs.]

A general well-illustrated article based on personal observations made during a trip to Brazil.

C. M. W.

BLANC (Georges) & VALTIS (Jean). Le kala-azar sensibilise-t-il le spermophile de Macédoine vis-à-vis de l'infection tuberculeuse expérimentale?—*C.R. Soc. Biol.* 1931. Jan. 30. Vol. 106. No. 3. pp. 154–155. [1 ref.]

DOSTROWSKY (A.). The Geographic Distribution of Leishmaniasis of the Skin in Palestine—*Harefuah.* Jerusalem 1930. Sept.-Oct. Vol. 4. No. 5. p. 241.

LEPROSY.

PHILIPPINE JOURNAL OF SCIENCE. 1931. Apr. Vol. 44. No. 4. pp. 449-480.—**Report of the Leonard Wood Memorial Conference on Leprosy held in Manila, Philippine Islands, January 9 to 23, 1931** [WADE (H. W.), Chairman].

This remarkable conference was organized and financed by the Leonard Wood Memorial Fund for the Eradication of Leprosy through its Secretary, Mr. Percy Burgess, and was presided over by Dr. H. W. WADE. Twenty-two delegates with great experience of leprosy from every quarter of the world met in Manila and, without wasting time over formal papers, took part in a free and frank discussion of the great problem how to rid the world of leprosy. Remarkable unanimity was arrived at with regard to nearly all points. They recommended that an adequate digest of the yearly leprosy literature throughout the world should be published. A nomenclature for general use was agreed to with definitions of clinical terms and a classification much on the lines of that of E. MUIR was adopted, the lepra reaction should be further studied, the great importance of early diagnosis was emphasized, the procedures necessary for full clinical and bacteriological examinations were laid down. The treatment of leprosy was discussed under the headings of general and special measures, the various derivatives of Hydnocarpus oils, with their methods of preparation, were detailed and the standardization, appraisal and organization of treatment were discussed, together with the question of cure, relative cure and negative cases; the term "arrested" was preferred to "relatively cured." The necessity of a follow-up of discharged patients, the study of contacts and the standardization of records were stressed. Prophylaxis was not specifically dealt with, but the findings of the unpublished Bangkok meeting in December 1930 of the Leprosy Commission of the League of Nations were considered and approval was given to those findings in principle. The importance of further epidemiological studies and the influence of diet were stressed, together with further research on etiology, pathogenesis, biochemistry and pharmacology. It was also decided to form an International Leprosy Association with a scientific journal of its own, and a temporary Council was initiated with Dr. Victor G. HEISER as President.

L. Rogers.

UNION OF SOUTH AFRICA. ANNUAL REPORT OF THE DEPARTMENT OF PUBLIC HEALTH YEAR ENDED 30TH JUNE, 1930. pp. 23-36. With 4 charts. **Leprosy.**

COCHRANE (Robert G.). **Report on Leprosy in the Union of South Africa.**—*Union of South Africa. Ann. Rep. Dept. Public Health Year ended 30th June, 1930.* Annexure "A." pp. 59-65.

The Union report contains elaborate tables and charts illustrating the cases of leprosy in the six leper Institutions of South Africa. These show a great decline in the number of European and mixed coloured patients since 1913 with 94 and 112 remaining, but an equally marked increase in the native lepers due to better arrangements for their collection by motor ambulances. Voluntary admissions are steadily increasing, but most are still advanced cases. One of the medical officers became infected by pricking his finger through a rubber glove, but he is improving. There are estimated to be still from 1,500 to 2,000 undis-

covered native cases at large. Arrangements are being made to examine the close contacts of newly discovered cases. The Robben Island leper institution was to be closed in March 1931. A Leprosy Advisory Committee was held in Pretoria and was attended by Dr. R. G. Cochrane. The present compulsory segregation policy of South Africa was endorsed and clinics were considered to be impracticable on account of the sparsely populated nature of the infected native areas. A report of a tour of Dr. Cochrane is appended in which he concurred in the above policy.

L. R.

- COOKE (F. H.). **Short Note on the Leper Settlement, Ho, 1929-30.**—*Gold Coast Rep. on Med. & San. Dept. for Year 1929-1930.* Appendix C. pp. 191-192.
DIXEY (M. B. Duncan). **Leprosy Investigation Report.**—*Ibid.* Appendix D. pp. 192-197.

The first of these notes deals with the Ho Leper Settlement, where 499 lepers were well housed at the end of March 1930, with 70 acres of land to cultivate, which will make the settlement more or less self-supporting; weaving, carpentry and shoemaking are carried on. The second note deals with the work of the whole-time leprosy medical officer of the Gold Coast, whose surveys show heavy infection of some areas up to 7 per mille, but with only two local medical officers and one travelling dispensary for over 400,000 people in the Northern Province, only a few can be treated as yet. Leper clinics at Tamale and Zuarungu attract increasing numbers of lepers.

L. R.

- SCHNEIDER (Otto). **Lepraerinnerungen aus Siam und China.** [**Leprosy Experience in Siam and China.**]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1931. Mar. Vol. 35. No. 3. pp. 145-159. With 8 text figs. [5 refs.]

This is a general account of the author's experience without any data of the distribution of the disease in these countries. He lays stress on the importance of early diagnosis and on the infective nature of the nasal discharges, and he states that he has seen many lepers become free from symptoms under long-continued intravenous injections of hydnicarpates, and after trials of other methods he has always returned to the hydnicarpates as the most reliable. In addition he gives chaulmoogrates orally and he records a case which cleared up on such tablets taken for 1½ years in doses of 20 or more daily.

L. R.

- HAWAII: ANNUAL REPORT OF THE PRESIDENT OF THE BOARD OF HEALTH OF THE TERRITORY OF HAWAII FOR FISCAL YEAR ENDING JUNE 30, 1930. pp. 352-392.—**Report of Bureau of Leprosy.**

In this report J. T. WAYSON deals with the administration of the Leper Bureau in Hawaii and gives numerous tables of data regarding the cases. Among treatments tried experimentally were fatty acids combined with iodine or sulphur, and calcium lactate and codliver oil to which ergosterol was added, but no definite results were obtained with either.

L. R.

LEPROSY REVIEW. 1931. Apr. Vol. 2. No. 2. pp. 39-78. With 7 figs. (1 map) on 4 plates. Quarterly Publication of the British Empire Leprosy Relief Association, 29, Dorset Square, London, N.W.1.

This number contains interesting information on the distribution of leprosy in four important British possessions. B. MOISER records a leprosy survey in Southern Rhodesia of 6,814 natives with 35 cases, 5 per mille, or including 22 cases in the settlement 8.3 per mille. He estimates the total in the colony as six to seven thousand, of whom 2,000 require to be in institutions as infectious under a voluntary system, while the early ones should attend clinics.

The leprosy problem in British Guiana is dealt with by F. G. ROSE: survey showed a heavy infection in an area previously thought to be healthy. He was able to get every infectious case isolated and all early cases treated without any difficulty, so that over 90 per cent. of the known cases in the visited districts are now being treated effectively. During the last 4½ years 166 lepers have been discharged from the hospital settlement, and in only 12.4 per cent. has recurrence of symptoms occurred, most of whom have cleared up again under treatment; for the first time the majority of the hospital patients are voluntary admissions to obtain treatment. A new leprosy ordinance is about to be introduced and this will permit treatment of early un-infectious cases at clinics.

Leprosy in Uganda is reported on by R. G. COCHRANE as the result of a visit last year. The number of lepers is estimated at 20,000, the Eastern Province being one of the worst areas in Africa with 11 per cent. of infections in parts. Financial difficulties greatly handicap the campaign against the disease, but treatment of cases is being carried out at a number of centres, including out-patient clinics. Dr. WIGGINS now has 150 children in a special hospital, from which a first batch of recoveries was discharged in January and new cases admitted in their place, and 120 adults are in another hospital.

Leprosy policy in Basutoland is discussed by P. D. STRACHAN, who is in charge of the compulsory segregation asylum, where the inmates numbered 487 in 1923, but by August 1930 they had risen to 688 as the result of the appointment of inspectors to tour the districts in search of cases. The cost of isolation is very high, but a number of discharges of recovered lepers are now being made and uninfected crippled nerve cases are to be placed on a neighbouring farm. The leprosy rate among the population of 500,000 is believed to be about 2 per cent. Owing to the paucity of medical officers in this mountainous area out-patient clinics are not practicable except at the seven government dispensaries, but it is proposed that early and little infectious cases should be induced to reside near a treatment centre in place of segregation.

Another interesting paper is by D. N. FORMAN on leprosy cases seen at a general dispensary in Allahabad, where 70 were seen in one year and received an average of 50 injections each, with none worse, 30 per cent. slightly, 33 per cent. moderately and 30 per cent. markedly improved, and 4 with the disease arrested. He concludes that these results are gratifying and indicate that general dispensaries have a very important place in the campaign against leprosy.

L. R.

CHATTERJI (S. N.). **Unsuspected Sources of Leprous Infection.**—*Indian Med. Gaz.* 1931. Mar. Vol. 66. No. 3. pp. 129–132. With 2 plates.

A number of cases occurring in the middle and upper classes in India are tabulated and the probable sources of infection are discussed, with illustrative cases and photos. Among these are contact with leprosy servants, especially cooks and maidservants and fruit and other food contaminated by leprosy vendors. Infection of nurses, washers of clothes, teachers in schools and other workers coming into contact with cases of leprosy are illustrated by examples, and the conclusion is come to that no one living in a leprosy country can be quite sure of escaping contact with an unsuspected case. On the other hand, doctors and nurses working among leprosy run little risk if they take ordinary anti-septic precautions.

L. R.

ALI (M.). **Blood-Groups among Lepers.**—*Jl. Egyptian Med. Assoc.* 1931. Feb. Vol. 14. No. 2. pp. 119–122. [5 refs.] [Public Health Labs., Cairo.]

Published investigations have given variable results, but 100 cases examined by the author showed A 44 per cent., B 21, O 18 and AB 17 per cent. On comparing these figures with those of normal groups it was found that group O is less predisposed and group A more predisposed to leprosy infection. PALDROCK on the other hand in Estonia found the O and B groups more predisposed to the disease, and other previous data are quoted giving still different results. No definite conclusion is therefore possible.

L. R.

MARKIANOS (J.). Recherche du bacille de Hansen par le procédé de la goutte épaisse. [**Search for Leprosy Bacilli in a Thick Drop.**]—*Bull. Soc. Path. Exot.* 1931. Mar. 11. Vol. 24. No. 3. pp. 172–173.

Leprosy bacilli are too rare in the blood for its examination to be of diagnostic value, for they are usually only found there during an acute exacerbation. Examination of blood obtained from leprosy lesions is, however, of diagnostic value, and the thick drop method is the best for this purpose. It may be carried out as in malaria, but after dehaemoglobinization by one-third alcohol, the slide is fixed in absolute alcohol for several minutes and then the last drops which remain are heated. Good fixation is thus obtained before staining with the Ziehl method as usual. In 30 nodular cases positive results were obtained and negative results in pure nerve cases.

L. R.

SABRAZÈS (J.). A propos du diagnostic bactériologique des diverses modalités de lèpre. [**Bacteriological Diagnosis of Leprosy.**]—*Gaz. hebdom. Sci. Méd. de Bordeaux.* 1931. Feb. 15. Vol. 52. No. 7. pp. 97–99.

This author agrees that in pure nerve cases leprosy bacilli are rarely found in the nose, and he regards making sections for the bacilli of a

small nerve removed from an anaesthetic area as the best diagnostic procedure in this form; nasal examinations are reliable in nodular cases. When there is nodular thickening of nerves they may be punctured with the needle of a syringe to enable the bacilli to be looked for.

L. R.

GIRARD (G.) & HÉRIVAUD (A.). La recherche du bacille de Hansen au niveau de la muqueuse nasale. [**Examination of the Nasal Mucosa for Leprosy Bacilli.**—*Bull. Soc. Path. Exot.* 1931. Jan. 14. Vol. 24. No. 1. pp. 68-71. [Pasteur Inst., Antananarivo & Leprosarium, Manankavaly.]

The authors' researches in Madagascar showed that for efficiency the examination of the nose of lepers for the bacilli should be made by producing an abrasion of the nasal mucous membrane with a curette in nerve cases, although the mucus alone is sufficient in nodular and mixed cases. In those with infiltrated lesions of the face the lepra bacillus is to be found in the nose in 100 per cent., in mixed cases in 71 and in nerve cases in 14 per cent.

L. R.

PARDO-CASTELLO (V.) & CABALLERO (G. M.). **Lazarine Leprosy: a Peculiar Monosymptomatic Form of Leprosy.**—*Arch. Dermat. & Syph.* 1931. Jan. Vol. 23. No. 1. pp. 1-10. With 8 text figs. [7 refs.]

By this term is meant a form of leprosy characterized by bullous formations followed by eschars and deep mutilating ulcers, often very extensive, such as 4 or 5 inches in diameter, of which the authors have seen twenty-three cases. They commence suddenly with a large blister followed by rapid sloughing extending even to the tendons and bones and taking many months to heal. They most frequently affect one of the extremities and discharge numerous acid-fast bacilli. Four of the patients died of septicaemia and in two amputation of an arm was necessary to save life. Removal of sloughs and packs or irrigation with chlorinated soda saved many cases from amputation. This condition is an early manifestation of the disease and may occur in the absence of other symptoms. A number of good illustrations are given.

L. R.

WILDISH (G. H.) & STOUTE (D. G.). **The Combined Treatment of Leprosy.**—*Jl. Med. Assoc. South Africa.* 1931. Jan. 10. Vol. 5. No. 1. p. 21.

By this term the authors mean tartar emetic intravenously alternating with potassium iodide orally, which they used in four cases with beneficial results. Potassium iodide was given in 10-grain doses three times a day up to four days, and stopped as soon as any reaction appeared, as it did in three of the cases after three days. Tartar emetic was then injected twice a week in doses increasing from $\frac{1}{4}$ to 1 grain up to ten injections. Subsequently 150 cases were treated in the course of twelve months. No ill effects were seen, and skin ulcers were especially benefited.

L. R.

DIMITRY (Theodore J.). **The Treatment of the Nasal Passages and the Eyes with Chaulmoogra Oil in Leprosy.**—*Amer. Jl. Trop. Med.* 1931. Jan. Vol. 11. No. 1. pp. 65-69. [6 refs.]

The author states that for some years he has administered chaulmoogra oil by atomization to the nasal cavities with good results, and as eye involvement only occurs after infection of the nasal cavities such treatment of the lesions and infectivity of the nose is of benefit to any eye lesions. He uses the ethyl esters in the same way. He also applies the pure oil to the conjunctiva if the cornea is anaesthetic, or diluted with olive oil 25, 50, or 75 per cent., and with incorporated benzocaine.

L. R.

LEGER (Marcel). Association au chaulmoogra de divers autres médicaments pour le traitement de la lèpre. La trypaflavine. [**Treatment of Leprosy by Chaulmoogra associated with other Remedies.**]—*Bull. Soc. Path. Exot.* 1930. Dec. 10. Vol. 23. No. 10. pp. 1009-1010.

The author advocates the use of chaulmoogra together with other medicines, for which purpose he uses a 2 per cent. solution of trypanflavine intravenously in doses of 5 cc. every three days.

L. R.

PALDROCK (A.). Meine spezifische Leprabehandlungsmethode. [**My Specific Treatment of Leprosy.**]—*Dermat. Woch.* 1931. Feb. 21. Vol. 92. No. 8. pp. 273-277. [24 refs.]

— Zur CO₂-Schnee- und Alepolbehandlung der Lepra. [**Treatment by CO₂-Snow and Alepol.**]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1931. May. Vol. 35. No. 5. pp. 298-302.

In the first of these papers the author reiterates once more his claim that his CO₂ snow and solganol method is a "specific" treatment, and he records that one of his patients has now remained clinically and microscopically healed for five years. In the second paper he states [contrary to the general opinion of British leprologists] that he has not seen any good effects in leprosy from the use of alepol (sodium hydriocarpate).

L. R.

DELANOË (E.). Traitement mixte de la lèpre par l'injection intraveineuse de novarsénobenzol et par les injections intramusculaires de vaccin B.C.G. La parfaite tolérance de cette méthode de traitement. La rétrocession rapide des phénomènes morbides. [**Treatment of Leprosy by Intravenous Injection of Novarsénobenzol and Intramuscular Injection of B.C.G.**]—*Bull. Soc. Path. Exot.* 1930. Dec. 10. Vol. 23. No. 10. pp. 1005-1009. [1 ref.]

The author records two cases of leprosy treated by intravenous injections of novarsénobenzol and B.C.G. vaccine intramuscularly into the buttock without any abscess formation and with rapid improvement in the symptoms.

L. R.

ROY (Ashutosh). **Intravenous Sodium Bicarbonate in Cases of Nerve Pain in Leprosy.**—*Indian Med. Gaz.* 1931. Apr. Vol. 66. No. 4. pp. 195–196.

The author records two cases of severe and intractable pain in nerve leprosy unalleviated by various other drugs, but which yielded to two intravenous injections of 150 and 200 cc. respectively of $\frac{1}{2}$ per cent. sodium bicarbonate in normal saline at five-day intervals.

L. R.

PARAS (Ernesto M.). **Blood Plasma Lipoids in Leprosy.**—*Jl. Philippine Islands Med. Assoc.* 1931. Jan. Vol. 11. No. 1. pp. 1–9. With 3 text figs. [15 refs.] [Chem. Section, Culion Leper Colony, Philippine Is.]

This is an interesting investigation which is well summarized in the following conclusions of the author :—

“ The blood plasma of 93 lepers, grouped in representative classes, was examined for total lipoids, cholesterol, phospholipoids, and total fatty acids. Twenty-one healthy individuals as normal controls were also examined for the above-mentioned constituents. Individuals were selected who differ in their mode of living, particularly as to diet. The ratios between these lipid fractions were also determined. The figures obtained for the staff members compare favorably with those given by Bloor for Americans, but those from the laboring class are comparatively much lower.

“ The investigation here reported presents evidence that it is the state of nutrition rather than the climatic factor that is responsible for the variation in blood lipoids that may be found in healthy individuals.

“ Using the data obtained for normal controls as the basis of comparison, a summary of the data obtained for lepers brings out the following facts :

“ 1. In the untreated cases of leprosy, the values for total lipoids and total fatty acids are markedly low. The cholesterol value is only slightly reduced.

“ 2. In the group of cases treated with chaulmoogra oil derivatives, but still positive, the total fatty acid values are distinctly low, but the total lipid values are only slightly lower than are those of the normal controls. The cholesterol value is somewhat higher than that in the untreated and the negative groups.

“ 3. In the treated cases that have become negative, the values for total lipoids, total fatty acids, and cholesterol are all within the normal limits.

“ The characteristic low values for total lipoids and total fatty acids in the untreated and the treated positive lepers, while normal in the negative cases, suggest at least two possibilities ; one possibility is that the leprosy bacilli attempt to protect themselves from the destructive action of the defence mechanism of the body by utilizing part of the plasma lipoids, and the other is the destructive effects of the chaulmoogra fatty acid treatment upon the lipid coating of the lepra bacilli. Further study along these lines is suggested ”

L. R.

WOOLEY (Jerald G.) with the Technical Assistance of ROSS (Hilary). **Phosphorus, Total Calcium, and Diffusible Calcium Content of the Blood Sera of Lepers and their Relation to Bone Changes.**—*Public Health Rep.* 1931. Mar. 20. Vol. 46. No. 12. pp. 641–658. [10 refs.]

The common atrophy and absorption of bones in leprosy has led to a number of investigations on the phosphorus and calcium content of

the blood in lepers with somewhat variable results. The present investigation was undertaken to ascertain the phosphorus, total calcium and diffusible calcium in the serum of 53 lepers of various types and stages, and tables of the detailed analyses are recorded. The sera of 47 lepers showed calcium and inorganic phosphorus within the normal limits, but estimations of diffusible percentage of calcium and calcium phosphorus, and the determination of the diffusible calcium-phosphorus balance ratios, revealed that the diffusible calcium and the percentage of total calcium that was diffusible were, on the average, considerably lower in the lepers than in 15 normal young men. X-ray examinations showed atrophy of the bones of the hands and feet in 41 of the 47 lepers examined.

L. R.

- i. DE SOUZA-ARAUJO (H. C.). **Experimental Leprosy.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1931. Apr. 25. Vol. 24. No. 6. pp. 577-598. With 5 plates (3 coloured). [18 refs.]
- ii. ——. **Treatment of Leprosy.**—*Ibid.* pp. 599-602. [1 ref.] [Oswaldo Cruz Inst., Rio de Janeiro.]

1. In this well-illustrated paper the author gives a summary of his attempts since 1928 to infect animals with leprosy on the lines of REENSTIERNA by inoculating fresh emulsions of lepromata swarming with lepra bacilli into white mice, white rats, guineapigs and monkeys, as already recorded in previous papers. Important controls were made by inoculating other animals with leprosy material previously sterilized by immersion in absolute alcohol, 10 per cent. formol or treated by heat, with the interesting result that after treatment by the two last methods nodules were produced far from the point of inoculation containing lepra bacilli, as did the liver and kidneys, and these dead organisms could not be differentiated from those found after injecting fresh unsterilized lepra bacilli. He therefore raises the question whether the apparent infections of animals with the fresh material were nothing more than the mechanical distribution in the animals of the injected bacilli without any multiplication indicative of a true infection.

ii. The author gives his experience of the treatment of leprosy since the year 1915; it is local and general as well as tonic. For the details the original must be seen.

L. R.

- MARCHOUX (E.), MARKIANOS (J.) & CHORINE (V.). Le bacille de la lèpre a-t-il été obtenu en cultures artificielles? [**Has the Leprosy Bacillus been cultivated?**—*C.R. Soc. Biol.* 1931. May 1. Vol. 106. No. 13. pp. 1191-1193. [2 refs.]

The authors point out that such claims as the recent one of SHIGA (see this *Bulletin*, Vol. 27, p. 339) to have cultivated the lepra bacillus lack proof that the organisms present in the cultures are really living, and not dead bacilli carried over from one tube to another. This point can only be tested in the case of the closely allied rat leprosy acid-fast bacillus, as rats are readily infected with it. They have repeated SHIGA's culture methods with this organism, and were able to prove

that the bacilli in the apparent cultures were all dead within two months and were carried over in subcultures without growth, so no true cultures were obtained.

L. R.

VAUDREMER (A.), SÉZARY (A.) & BRUN (C.). Essais de cultures du bacille de Hansen du sang et des lépromes. [**Attempts to cultivate the Lepa Bacillus from Blood and from Lepromas.**—*C.R. Soc. Biol.* 1931. May 1. Vol. 106. No. 13. pp. 1225-1228. [1 ref.]

The authors attempted to make cultures from the blood of lepers during acute exacerbations of the disease, and in a liquid medium of *Aspergillus fumigatus* they obtained blue staining mycelium, which they think may be a stage of the leprosy bacillus, although they do not feel certain about it.

L. R.

MARKIANOS (J.). Lèpre et virus filtrable. [**A Filterable Virus in Leprosy.**—*Ann. Inst. Pasteur.* 1931. Mar. Vol. 46. No. 3. pp. 291-295. [11 refs.]

The author recalls that in 1910 FONTÈS in Brazil showed that animals could be infected with the products of filtering tubercle bacilli through a Berkefeld bougie owing to the granules in the organisms passing through. In the present paper the results of similar experiments with material from rat leprosy containing Stephansky's bacillus are recorded with infection of healthy rats by injecting them with the filtrates. Young rats were most susceptible, for the acid-fast bacilli were found in their glands 20 days after inoculation, against two months in the case of adult rats. Thus the granules of the leprosy group of organisms are capable of producing infection and the greater susceptibility of young rats finds its parallel in that of children and adolescents to leprosy.

L. R.

SÉZARY (A.) & ROUDINESCO. Laryngite lépreuse. Dyspnée grave améliorée immédiatement par la médication "de choc." [**Dyspnoea of Leprous Laryngitis Promptly relieved by "Shock" Treatment.**—*Bull. Soc. Française Dermat. et Syph.* 1931. Feb. No. 2. pp. 230-232. [1 ref.]

A brief report of a case of laryngeal leprosy with urgent dyspnoea, treated with temporary relief by intravenous injections of a combination of the patient's own blood and a suspension of Dausse's colloidal chaulmoogra.

L. R.

DE SOUZA-ARAÚJO (H. C.). Le traitement moderne de la lèpre dans les principaux centres de léprologie. [**Modern Treatment of Leprosy.**—*Bruxelles-Méd.* 1931. Mar. 29. Vol. 11. No. 22. pp. 630-636. [2 refs.]

COCHRANE (R. G.). **A Review of the Present Methods of Treatment in Leprosy.**—*Brit. Jl. Dermat. & Syph.* 1930. Vol. 42. pp. 125-134. [6 refs.]

These experienced workers give brief summaries of the modern methods of treatment of leprosy for the help of those with less experience.

L. R.

BORREL (A.) & LARROUSSE (F.). Localisation lépreuse dans le foie du rat par le cysticerque du *Taenia crassicola*. [**Bacilli of Rat Leprosy and Cysticercus fasciolaris.**—*C.R. Soc. Biol.* 1931. Jan. 8. Vol. 105. No. 36. pp. 822-823. With 1 text fig.]

In this brief paper the authors record and illustrate the localization of the bacilli of rat leprosy in the capsule around a cysticercus of *Taenia crassicolis* in the liver of a rat. They conclude that this animal parasite may convey rat lepra bacilli to the liver from the intestinal canal.

L. R.

- AMBROGIO (A.). Ricerche biologiche in alcuni casi di lebbra. (Nota preventiva.)—*Giorn. Ital. di Dermat. e Sifil.* 1930. Aug. Vol. 71. Year 65. No. 4. pp. 1292-1301.
- ANTUNES (Alair). A lepra no Estado do Rio de Janeiro.—*Folha Med.* 1931. Apr. 15. Vol. 12. No. 11. pp. 129-131.
- DENNEY (O. E.). Leprosy. Some Nursing and Public Health Aspects.—Reprinted from *The Trained Nurse & Hosp. Rev.* 1930. July. Vol. 85. No. 2. 4 pp. With 5 text figs.
- DHUR-ROY (Jyoti) & RAKSHIT (A.). A Note on the Use of Ultra-violet Rays in the Treatment of Leprosy.—*Indian Med. Gaz.* 1930. Apr. Vol. 65. No. 4. pp. 209-210. [Chittaranjan Seva Sadan, Calcutta.]
- DUGUID (C.). Leprosy.—*Med. Jl. Australia.* 1931. Feb. 21. 18th Year. Vol. 1. No. 8. p. 233.
- KUSNETZOW (W. N.). Die Konstitution der Leprakranken.—*Arch. f. Schiffs- u. Trop.-Hyg.* 1930. May. Vol. 34. No. 5. pp. 231-236. [21 refs.]
- LOUSTE, LÉVY-FRANCKEL & GADAUD. Un cas de lèpre érythromaculeuse et atrophique d'origine marocaine.—*Bull. Soc. Française Dermat. et Syph.* 1931. Jan. No. 1. pp. 27-29. [2 refs.]
- MILIAN & DEGOS (R.). Lèpre aiguë.—*Bull. Soc. Française Dermat. et Syph.* 1931. Feb. No. 2. pp. 184-185.
- NICOLAS (J.), MASSIA (G.) & WEIGERT (H.). Deux cas de lèpre.—*Bull. Soc. Française Dermat. et Syph.* 1931. Jan. No. 1. pp. 123-125. [R.L. 25-27.]
- PALDROCK (A.). Zur Frage der Leprabehandlung.—*Immunität. Allergie u. Infektionskr.* Munich. 1929-30. Vol. 2. No. 6. pp. 173-178. [17 refs.]
- RAJEWSKY (A. S.). Begleitinfektion bei Lepra.—*Arch. f. Schiffs- u. Trop.-Hyg.* 1930. June. Vol. 34. No. 6. pp. 303-309. [7 refs.]
- ROGERS (Leonard). When will Australia adopt Modern Prophylactic Measures against Leprosy?—*Med. Jl. Australia.* 1930. Oct. 18. 17th Year. Vol. 2. No. 16. pp. 525-527.
- TISSEUIL (J.). Sur un cas de lèpre nodulaire à évolution tuberculoïde secondaire.—*Bull. Soc. Path. Exot.* 1931. Jan. 14. Vol. 24. No. 1. pp. 17-21. [Gaston Bourret Inst., Nouméa.]

SPRUE.

- i. BAUMGARTNER (E. A.) & JEWETT (C. Harvey). **Tropical Sprue. Experience with Thirty-Six Cases.**—*Arch. Intern. Med.* 1930. Oct. Vol. 46. No. 4. pp. 597-604. [14 refs.]
- ii. ——. **The Blood Picture in Tropical Sprue.**—*Folia Haematologica.* 1930. Vol. 43. No. 1/2. pp. 192-205. With 4 figs. [29 refs.]

i. A study of sprue is presented from 36 patients who have entered the Clinic at Clifton Springs during the last 5½ years. Most were missionaries from the Orient, sixteen from India, five from Korea, five from the Philippines, two from Porto Rico, and one each from Costa Rica and Persia. Twenty-four were women and twelve were men. The oldest was 71, and 16 were between 40 and 60; none was under 32. One patient developed symptoms of sprue with tetany three years after return from the Philippines, five gave a history of previous amoebic dysentery and five of malaria contracted during their stay in the tropics. The early symptom was usually diarrhoea. Several complained of a severe burning sensation in the mouth and all of marked abdominal distension with much gas, and two of severe burning of the stomach. Four patients gave positive Trousseau's and Chvostek's signs or tetany spasms.

The faeces were almost always characteristic of sprue during the acute process. In twenty-three the authors were able to grow a *Monilia* which corresponded with *M. psilosis*. In nine others an atypical yeast organism appeared. In twelve cases a more or less severe secondary anaemia was present; in sixteen the blood picture was that of pernicious anaemia; in eight the blood was normal. Blood calcium estimations were carried out in thirty patients and low values were found in eleven. Gastric fractional test meals showed achlorhydria in seven cases. X-ray studies of the gastro-intestinal tract in twenty-nine cases showed dilated atonic gas-filled colons in thirteen. Another feature was the apparent elongation of the colon which appeared to fill the abdomen almost completely. In 10 of the 36 patients the disease appeared to have been arrested. Five others had mild symptoms only and nineteen were severely ill. One patient died one week after admission, whilst a second died after leaving hospital.

In the entire group only two patients failed to respond definitely to treatment, mainly by a diet high in protein but low in fat and carbohydrates. In the authors' experience liver has been as efficacious in the control of the anaemia in sprue as in pernicious anaemia. In one case with low blood calcium, Collip's parathyroid extract was given, and in two others grain 1/10 of the dry extract and calcium lactate 10 grains three times daily. In these patients the blood calcium quickly became normal, and the tetanic reactions disappeared. In the fatal case no apparent effect was produced, as the blood calcium at autopsy was 5.6 mgm. per 100 cc. Another did not respond to this or to intravenous injections of calcium chloride. Patients with achlorhydria as well as those with pernicious anaemia were given dilute hydrochloric acid.

ii. This appears to refer to the same series. Sixteen of the 36 presented a blood picture resembling that of pernicious anaemia. The anaemia was of the megalocytic type, associated with leucopenia and a relative lymphocytosis. The Arneth index showed little if any deviation from the normal.

P. H. Manson-Bahr.

BASSLER (Anthony) & LUTZ (J. Raymond). **Sprue : Some Points on Etiology, Diagnosis, and Especially Treatment.**—*Jl. Amer. Med. Assoc.* 1930. Dec. 27. Vol. 95. No. 26. pp. 1961-1964. [11 refs.]

An account of ten cases of sprue treated in New York. Four methods are described: (1) High-liver diet (with or without excess of vitamins). (2) Transduodenal lavage. (3) Correction of intestinal infection. (4) Residence for a time in a colder climate. Blood transfusion, injection of iron preparations and the types of diet formerly in use did not produce good results in their hands.

The usual diet given was liver cooked in any form and taken at least twice daily, from 4 to 8 ozs. cooked weight, liver sausage, blood sausage and the marrow from grilled or roasted long bones that had been split. In addition 120 gm. (4 oz.) of cooked beef or mutton and no less than 300 gm. (10 oz.) cooked weight of the following vegetables: lettuce, cucumber, spinach, asparagus, rhubarb, endive, marrow and a whole host of other delicacies, including dandelions. When practicable additions were made to the vitamin contents as follows: cod-liver oil in doses of 4-10 cc. for vitamins A and B; orange, pineapple and fruit juices for A, B and C; yeast, peas and lentils for B; tomatoes, lemon juice, oysters, apples and bananas for C; and lettuce, milk and fats for E.

Transduodenal lavages with hypertonic saline solutions of 9 gm. each of sodium sulphate and sodium chloride in 1,000 cc. at 104° F. were used before bedtime to clear out the fermenting food residue of the day's meals. The quantity introduced was rarely over 500 cc. As improvement took place, these were employed less frequently and the quantity reduced. It was impossible to estimate the benefits due to the transduodenal lavage; apparently the digestive symptoms are controlled more quickly with than without them. There was one fatal case, advanced at the time of admission.

In the discussion following the paper there is little to remark save the declaration of de RIVAS that he had seen a fatal case of gastro-colostomy, performed in mistake for a gastro-enterostomy, which afforded an exact clinical *simulacrum* of sprue.

[There is nothing in this paper which points to the elucidation of the etiology of sprue. On the other hand objections may be taken to the exaggerated generalization on such a meagre series of cases.]

P. H. M-B.

TYNER (James D.). **Tropical Sprue : its Differentiation from Pernicious Anemia by the Arneth Count.**—*Amer. Jl. Trop. Med.* 1930. Nov. Vol. 10. No. 6. pp. 435-439. [5 refs.] [Sanitarium & Clinic, Clifton Springs, N.Y.]

The Arneth Index for a control group of 10 normal adults was 61.1. The usual normal is said to be 60. The average index of ten pernicious anaemia cases was 32.45; four of these patients had been receiving liver therapy for several weeks and gave an average of 33.5. The average index of seventeen sprue cases was 62.1, while that of the three remaining to complete the series of twenty worked out at 32.8. The large majority of sprue cases therefore present an index somewhere about the normal. Since 85 per cent. of sprue cases have an index close to the normal, 61.1, and pernicious anaemia averages 32.45, it is suggested that the method should be used in the differential diagnosis of these two diseases.

P. H. M-B.

WINTROBE (M. M.). **The Hemoglobin Content, Volume and Thickness of the Red Blood Corpuscle in Pernicious Anemia and Sprue, and the Changes associated with Liver Therapy.**—*Amer. Jl. Med. Sci.* 1931. Feb. Vol. 181. No. 2. pp. 217-239. With 4 charts in text. [18 refs.] [Med. Dept., Tulane Univ. of Louisiana, & Charity Hosp., New Orleans.]

A series of one hundred blood examinations have been carried out in sixteen cases of pernicious anaemia, and eight cases of sprue, of all degrees of severity and at varying intervals during remissions induced by liver therapy. The customary blood examinations were made and in thirty-two instances cell diameter and thickness were measured as well.

The mean volume and the haemoglobin content of the red blood corpuscles in pernicious anaemia and sprue are significantly greater than normal during the stage of relapse of these diseases, and both these are correlated with the red cell count, high values for these constants being found when the cell count is low and lower values as the cell count rises. The correlation between mean corpuscular volume and the cell count is less marked in the severe stages of anaemia because of the presence of large numbers of small and distorted cells in the blood stream at such a time.

[The paper is illustrated by four elaborate plotted charts and summaries stated in seven tables. It is so replete with mathematical formulae and statistical details that the research worker is advised to consult it in the original.]

P. H. M-B.

BAUMGARTNER (E. A.) & SMITH (G. D.). **Blood Picture before and after the Development of a Severe Anemia in a Case of Sprue. Red Cell Diameters, Arneth Index, Platelets.**—*Clifton Med. Bull.* 1930. Oct. Vol. 16. No. 4. pp. 189-194. [10 refs.]

The case in which these observations were made has been watched since 1923. At first, symptoms were mainly neurasthenic, but gradually the signs of sprue became established. A moderate anaemia with normal sized cells was at first noted and gradually, as the symptoms of sprue became more manifest, the red cells became larger (8.5μ). The anaemia improved and the erythrocytes decreased in size to normal but this decrease lagged behind the improvement in the number of erythrocytes. Arneth counts showed an index more like the normal than that of pernicious anaemia.

P. H. M-B.

LE GAC (P. L.). **Sur un cas de sprue observé chez un Européen à la Côte d'Ivoire. [Case of Sprue in European (from Tonking).]**—*Bull. Soc. Path. Exot.* 1930. July 9. Vol. 23. No. 7. pp. 709-710.

A "sous-officier" was admitted to the Hospital at Abidjan. The symptoms were those of sprue associated with an anaemia of severe degree (40 per cent. haemoglobin and 2,356,000 red blood corpuscles per cmm.), and yeasts were readily isolated from the faeces. As the patient was attacked by the disease whilst still on board ship on his voyage out to the Colony, the infection was not contracted in West Africa, but in Tonking where he had previously served for four years. He had been two years in France, during which time the disease must have remained latent.

[The title of this paper tends to mislead as the disease did not originate in West Africa.]

P. H. M-B.

GOVER (W.). **Sprue treated with Intravenous Injections of Calcium Chloride.** [*Memoranda.*].—*Brit. Med. Jl.* 1930. July 12. p. 61.

Sprue is a very rare disease in Costa Rica, hence the interest of the case reported. A coffee planter, aged 69, was first seen in August 1928 with symptoms of sprue. On the customary treatment with calcium lactate, Batavia powder, strict dietary, liver, strawberries and subcutaneous injections of iron and arsenic he lost 7 lb. In July 1929 intravenous calcium treatment (3 cc. of a 2 per cent. solution in a series of twenty-five injections) was started in conjunction with parathyroid extract, but the parathyroid was discontinued later since it did not seem to have any effect. For a few minutes after the injection, a sense of constriction in the throat was noted, but there was otherwise no inconvenience. On this treatment the general condition of the patient greatly improved and he put on 22 lbs.

P. H. M-B.

HARSTON (Montague). **A Note on the Treatment of Sprue by Ultra-violet Irradiation. (Hypopiesia a Contra-Indication.)**—*Brit. Jl. Actinotherapy.* 1930. Dec. Vol. 5. No. 9. p. 189.

In ordering this treatment specific details should be given, such as the appropriate wave-length and the character of the apparatus, the time of exposure, etc. Sprue is associated with low blood pressure, so that it is necessary to measure this before commencing treatment. In cases where patients can stand irradiation without depressing effects on the blood circulation, there is no apparatus better than the "Nine Arc Tungsten Bath" in conjunction with SCOTT's treatment. The treatment advocated is Tungsten arc baths (wave-length 1,800–2,200 A.U.) bi-weekly at three-day intervals, five minutes duration each bath, for twelve treatments. After the course, a month's interval should be given and irradiation resumed if necessary. If it is resumed, the duration of the first bath should not be more than two minutes.

P. H. M-B.

MENDELSON (Ralph W.) & BEAM (M. P.). **Non-Tropical Sprue.**—*South-western Med.* 1930. Sept. Vol. 14. No. 9. pp. 430–432. With 2 text figs.

So called non-tropical sprue is being more frequently reported in American medical journals. The present case was that of a lady of 50 years of age born in Germany who had lived in New York for 31 years. She suffered from purulent bronchitis accompanied by frothy diarrhoea. She did not suffer from sore mouth nor was anaemia present. A rapid improvement took place on anti-sprue treatment with calcium lactate and parathyroid. [It is by no means clear upon what grounds this case is classified as non-tropical sprue.]

P. H. M-B.

CRAWFORD (Harold) & GUTTERIDGE (Noel M.). **Sprue and Amoebic Dysentery.**—*Med. Jl. Australia.* 1930. Dec. 20. 17th Year. Vol. 2. No. 25. p. 823.

A patient, aged fifty-six, had suffered from acute dysentery in China, two years before the advent of sprue with continuous diarrhoea, and sore mouth and tongue. The stools, though strongly suggestive of sprue, contained cysts of *Entamoeba histolytica*. There was much anaemia

and the red blood cells showed anisocytosis with slight macrocytosis. The administration of emetine bismuth iodide in pill form (grains 3) was followed by very severe diarrhoea and vomiting. The general condition did not improve and the anaemia became more profound, so that two blood transfusions had to be performed. After the second of these improvement set in. The diet was carefully regulated. When seen last, in August 1930, he weighed 12 stone and the bowels were regular.

The cure is ascribed to the emetine bismuth iodide treatment, followed by blood transfusion.*

P. H. M-B.

STARR (Paul) & GARDNER (Lois). **A Biochemical Study of Two Patients with a Condition simulating Sprue.**—*Amer. Jl. Trop. Med.* 1930. July. Vol. 10. No. 4. pp. 283–293. With 4 charts. [5 refs.] [Med. School, Northwestern Univ., & Wesley Memorial Hosp., Chicago.]

This report presents biochemical data made during two years of two patients having fat diarrhoea—the so-called non-tropical sprue—with emaciation, anaemia and tetany. No metabolic studies in sprue compare with these. The main object was to study the tetany associated with fat diarrhoea. However, no indication of the cause of fat diarrhoea itself was found. Liver and pancreatic functions were normal as far as present clinical methods can determine. It was thought that the tetany was due to continued depletion of readily available calcium by years of excessive calcium excretion. Although they were equally susceptible to diarrhoea arising from fatty foods, these two patients differed in their degree of susceptibility to tetany. The first developed profound tetany with low blood calcium at two periods whilst the second case had little tetany and low blood calcium only when first studied. Fatty diarrhoea in the first case produced acute tetany. It was found that the ingestion of large amounts of calcium by the mouth prevented fat diarrhoea. On the other hand calcium loss by the bowel as a result of fat diarrhoea was not found in the present study.

P. H. M-B.

BAUMGARTNER (E. A.) & CASE (C. E.). **Reticulocyte Response in a Case of Tropical Sprue on a Diet not including Liver.**—*Clifton Med. Bull.* 1930. Oct. Vol. 16. No. 4. pp. 183–188. [10 refs.]

Before the advent of liver dietary the occasional rapid increase in the number of erythrocytes in cases of pernicious anaemia must necessarily have been accompanied by a corresponding rise in the reticulocytes and the same thing must have occurred in those cases of sprue with severe anaemia that improved. The present case indicates that the reticulocytes rise in sprue in the absence of a liver dietary. ASHFORD has already described a case on his regular sprue diet in which the rise was over 10 per cent.

In this instance the patient, a lady of 67 who had lived in China, developed typical sprue. At the time of her admission her weight was 134 lbs. Gastric analysis revealed a normal hydrochloric acid content.

* In the February 7 number of the same journal CALOV expresses doubt of the accuracy of the diagnosis. He asks for information on the appearance of the skin, abnormalities in the abdomen, composition of stools and diet.—Ed.

The haemoglobin was 47 per cent., the red cells 2,070,000. On a high protein diet (protein 100 gms.) without liver, there was a reticulocyte increase to 9 per cent. on the 18th day. This is a slower response than occurs usually in a patient with pernicious anaemia or in sprue patients with severe anaemia who are given liver. The erythrocytes, which were larger during the severe anaemia, gradually decreased to the normal size.

P. H. M-B.

HERNANDEZ (Luis G.). Pancreatic Juice in Normal Individuals and in Sprue.—*Porto Rico Jl. of Public Health & Trop. Med.* 1930. Dec. Vol. 6. No. 2. pp. 209-216. [7 refs.] [School of Trop. Med., Univ., Porto Rico.]

In sprue it has been demonstrated that the entire nervous system, particularly the autonomic nervous system, is functionally altered, and therefore the nervous reflexes that control the flow of pancreatic juice are also probably altered.

Analyses of normal duodenal contents, as well as those of sprue patients, are given. A comparison is made of the Gross and Wohlgemuth's methods with those of Sokhey and Malandkar, from which it appears that the duodenal enzymes are present in sprue but are diminished in amount.

P. H. M-B.

- HARRIS (R. M.). Tropical Sprue: Report of a Case.**—*Southern Med. Jl.* 1930. Oct. Vol. 23. No. 10. pp. 950-953. [15 refs.]
- SUAREZ (Ramon M.). "El tratamiento del esprú y el uso del extracto acuoso de hígado en su anemia."**—*Bol. Asoc. Med. de Puerto Rico.* 1931. Mar. Vol. 23. No. 186. pp. 74-86. With 7 charts in text. [25 refs.]
- Tedeschi (C.). Sprue, pseudosprue o blastomicosi intestinale?**—*Arch. Ital. Sci. Med. Colon.* 1930. Oct. 1. Vol. 11. No. 10. pp. 577-594. With 15 text figs. English summary (5 lines). [Colonial Hosp., Derna, Cirenaica.]
- VAIDYA (S. K.). Observations on Pernicious-Type Anaemias in the Tropics, and on the Disease called Sprue.**—*Jl. Trop. Med. & Hyg.* 1930. Sept. 15. Vol. 33. No. 18. pp. 265-282. With 6 charts. [37 refs.]
- WILKERSON (Fred). Sprue treated with Liver.**—*Southern Med. Jl.* 1930. Oct. Vol. 23. No. 10. pp. 947-949. [9 refs.]

HELMINTHIASIS.

KHALIL (M.). The Pail Closet as an Efficient Means of controlling Human Helminth Infection as observed in Tura Prison, Egypt, with a Discussion on the Source of Ascaris Infection.—*Ann. Trop. Med. & Parasit.* 1931. Mar. 31. Vol. 25. No. 1. pp. 35-62. With 3 text figs. & 7 figs. on 4 plates. [18 refs.]

The diagnostic techniques were gravity precipitation of urine for schistosome eggs, a smear from the faecal surface and preferably from blood or mucus on it for the same, and flotation of faeces by Khalil's method in a conical Erlenmeyer flask. "This method is very efficient in detecting the ova of ancylostoma, trichostrongylus, and to some extent ascaris ova." [In the abstractor's tests, never controverted, this method collected on the average one hookworm egg in fifty.] In Tura Prison there are in use pail privies, in fact the system which has served Indian jails so excellently for very many years. As Khalil notes, its efficiency depends on trustworthy supervision; examination in 1924 by the means noted of 2,610 Egyptian prisoners showed that whereas the percentage of ancylostome and schistosome infections fell with the length of stay in prison, ascaris and trichuris infections did not. As regards schistosomes, the jail water supply is from the Nile and the percentage of infection with *S. haematobium* of prisoners admitted in 1923 was in 1924 30.6 (Delta 18.1, Upper Egypt 15.7) of 278, and after 10 years' imprisonment 5 of 99. Villages close to the jail taking water from a canal have 75 per cent. of the population infected. As regards ancylostomes, the diagnostic test mentioned gave 67.3 per cent. infected in those admitted in 1923 and examined in 1924, while in those who had been imprisoned for 10 years it was 12. In a village 3 km. from the jail it was 88. From the prison the sewage is conveyed, apparently carried, to a farm isolated in the desert at a distance of 3 km. from the jail, stored in tanks till needed, and then used as the sole means of irrigating the soil; the death of hookworm eggs by lengthy storage is apparently not aimed at. Here vegetables are grown in abundance, and removed with adherent soil to the jail kitchen. In this soil in the jail were found ascaris ova [hookworm larvae are not mentioned]. All vegetables are cooked. "It was evident, that the hands of all prisoners engaged in the kitchen were contaminated and in turn they contaminate the food when it is being distributed after cooking." All 2,618 (8 were foreigners) prisoners were given 5 cc. of carbon tetrachloride on one day in May 1924, whether infected or not. "Only 52 complained of any symptoms as a result of the treatment. In many cases it was possibly malingering." In 1928, 945 of them remained. Among them the technique mentioned had shown infections as follows: 1924, 183; 1925, 47; 1926, 17; 1928, 5. Presumably there had been no treatment in the intervals.

Clayton Lane.

SERRA (Américo). Helminths in Southern Porto Rico. An Analysis of 2,200 Fecal Examinations.—*Porto Rico Jl. of Public Health & Trop. Med.* 1930. Sept. Vol. 6. No. 1. pp. 91-105. With 7 graphs. [Biol. Labs., Health Dept., Ponce, Porto Rico.]

Of the faecal specimens 2,000 were rural and 200 urban. The mode of examination was by 4 direct smears and about half were also

examined by the "brine flotation method"—which of the many is not stated, but the results are to be published later. Of the urban population 66.25 per cent. were found infected, and of the rural 90.05. Of the urban specimens the percentages infected with different parasites were: trichuris 58.25, hookworms 17.45, ascaris 5.2, *S. mansoni* 7.35, strongyloides 3.1, *H. nana* 0.55, *T. saginata* 0.10. The distribution by age, sex and locality is given.

C. L.

STEKHOVEN (J. H. Schuurmans) Jr. Ingewandswormen op Terschelling (Midsland). [**Intestinal Worms on Terschelling.**—*Nederl. Tijdschr. v. Geneesk.* 1931. Feb. 21. 75th Year. 1st Half. No. 8. pp. 859–873. With 1 text fig. [1 ref.]

An investigation was carried out of the population on the island of Terschelling where it was found that an extreme degree of helminthic infection existed. The faeces were first examined in smears for the actual helminthic ova present. Quantitative estimation of the number of eggs per gram of faeces was made according to the method of STOLL. Soil infection was determined according to the method of BROWN. Ascaris and trichuris were found, at Midsland, to be present in 36.7 and 53.1 per cent. of the population respectively. In West Terschelling the proportions reached 82.4 and 93 per cent. Infection was greatest in the earlier years of life and diminished somewhat after the 15th year. The origin of this extensive infection is found in the practice of the inhabitants to manure their gardens with human faeces. It is possible to demonstrate the helminthic ova in the soil. Oxyuris appear definitely to give rise to eosinophilia but the rôle of other worms in this regard is not so certain. Prevention of infection would most satisfactorily be obtained by disinfection of faeces.

W. F. Harvey.

KUDRJAWZEW (W.) & SCENSNOWIC (W.). Vergleichende Abschätzung helminthoovoskopischer Methoden unter den Bedingungen einer Massenuntersuchung der Bevölkerung. [**Comparative Value of Various Diagnostic Ovoscopic Methods in Helminthology for Use in Mass Surveys.**—*Rev. Microbiol., Epidémiol. et Parasit.* 1930. Vol. 9. No. 3. pp. 427–436. [9 refs.] [In Russian. German summary.]

This is a critical evaluation of the various methods employed for the diagnosis of helminthic infections by means of eggs, in their application to mass surveys of the population. The comparison is based on an examination of 4,632 persons by the following three methods: Koch's method of scraping from the peri-anal folds for Oxyuris, the Bürett method and Fülleborn's method. The authors believe that examination by the three methods combined is the most practicable and exact one for surveys on a large scale. In a footnote, by the editor, Fülleborn's method of examination of the surface film combined with the examination of the sediment is recommended.

C. A. Hoare.

TARASSOW (W.). [The Clinical Symptomatology of Helminthiasis].—*Pensée Méd. d'Usbéquistan et de Turquénistan*. Tashkent. 1930. Nov.-Dec. Vol. 5. No. 2-3. pp. 39-42. [6 refs.] [In Russian.]

The author has made clinical observations on 348 cases suffering from various types of helminthic infections (*Ascaris lumbricoides*, *Diphyllobothrium latum*, Taeniidae, *Trichuris trichiura*, *Enterobius vermicularis*, *Hymenolepis nana*). The object was to ascertain whether specific clinical symptoms were present upon which a differential diagnosis could be based. The symptoms observed in connexion with the various infections are given in tabular form, together with a record of similar observations by two other authors based on several hundred cases. Tarassow concludes that (1) the clinical symptoms in helminthiasis are not characteristic of any definite species of helminth, but are common to a whole series of different forms; (2) the clinical symptomatology alone provides no grounds for distinguishing the various forms of helminthic infections; and, therefore, (3) the name helminthiasis alone should be retained for all of them, irrespective of their nature.

C. A. Hoare.

FENG (L. C.). **Studies on Tissue Lesions produced by Helminths.**—*Arch. f. Schiffs- u. Trop.-Hyg.* 1931. Jan. Vol. 35. No. 1. pp. 1-10. With 4 text figs. [11 refs.] [Peiping Union Med. College, Peking.]

It is shown, by the study of four cestode, three trematode and two nematode species parasitizing the alimentary canals of animals, that some parasites produce a digestion of the surrounding tissues of the host, but that in others there is no evidence of this. The former sink deeply into the tissues and are surrounded by a homogeneous zone, for the nuclei do not stain and cell outlines are not visible; moreover this zone must be more or less liquid during life since it forms a mould of the anterior end of the worm. Feng particularly notes that this liquefying power is absent in *A. lumbricoides*; his observations do in fact raise the question whether its occasional presence does not explain those rare instances where this parasite produces perforation of the gut, and where hookworms penetrate deep into it.

C. L.

ONSLow (D. V.). **The Prevention of Trouble due to Aquatic Growths in Condenser Systems, with Special Reference to the Destruction of Mussels. Critical Résumé.**—11 pp. The British Electrical and Allied Industries Research Association (incorporated). 1929. London: 36 & 38, Kingsway, W.C.2.

Condenser systems have been much hampered by the growth of mussels in suction pipes, those of the Bombay Electric Light Station being reduced in effective diameter from 24 to 20 in. in 6 months. The Manometer Chloronome* treatment adds chlorine in minute and

* Paterson Engineering Co., Ltd.

measured quantities to water. One-fifth part per million keeps mussels from appearing in tubes by removing their food; 1 part in 10,000 of copper sulphate acts in the same way. [The apparatus may prove useful in the prevention of schistosomiasis.]

C. L.

GRIFFITHS-JONES (E.), ATKINSON (H.) & HASSAN (Ali). **A Comparison of the Relative Killing Power of Chlorine and Chloramine on Schistosome Cercariae of the Human Type, together with a Note on the Relative Stabilities of Chlorine and Chloramine.**—*Ann. Trop. Med. & Parasit.* 1930. Dec. 18. Vol. 24. No. 4. pp. 503–525. [5 refs.] [Public Health Labs., Cairo.]

" 1. Both *S. mansoni* and *S. haematobium* cercariae are susceptible to the action of chlorine and chloramine.

" 2. One part per million available chlorine will kill the cercariae in two and a half to three hours in filtered water.

" 3. Chloramine, when prepared in the apparatus supplied by Messrs. United Water Softeners, Ltd., and in accordance with the printed instructions which they supply,* is less effective than chlorine in killing the cercariae.

" 4. Chloramine when prepared according to the 'Water cart method'† is more effective in killing the cercariae than bleaching powder. One part per million will kill the cercariae in one hour in filtered water.

" 5. Chloramine prepared by admixture of the ammonium compound and the chlorine solution in syphon was found to be far less stable than chlorine prepared from bleaching powder or from chlorine bulb, whereas with chloramine prepared by the method used in the later experiments the reverse is the case. The stability of chloramine was demonstrated particularly in its resistance to absorption by matter in suspension and solution. Absorption by tap water is only slight but is higher in both raw Nile water and canal water.

" The absorption increases with the dose and also with the time of contact. The amount remaining after two hours' contact is roughly three-quarters of the dose in raw Nile water and rather less in canal water. The amount of residual chlorine when bleaching powder is used is distinctly less, i.e., about half the dose in raw Nile water and still less in canal water after two hours' contact."

C. L.

The printed instructions read as follows:—

* " ' Unscrew cap of chlor-sparklet apparatus, fill to 50 c.cm. mark with water and dissolve two of these tablets therein. The ammonium solution resulting is to be mixed with the chlorine solution in the bottle thus forming active chloramine. ' "

† " *Mono-chloramine.* Fill siphon to 1,250 c.cm. mark with water and discharge into it one chlorine bulb. *Shake well.* The siphon will then contain on an average 3 grammes of Cl_2 . Fill up the kettle with water, crush a tablet of ammonium hydrogen carbonate, add it to the water in the kettle and stir well. 250 cc. of the chlorine water is then added to the kettle (the cap of the siphon can be used to measure this), and the mixture is then well stirred.

" Mono-chloramine is produced at once, and the contents of the kettle are emptied into the water cart (110 gallons) which now contains 0.6 gramme of Cl_2 (0.6 gramme = 1 part per million in the cart). In this process there is no loss of available chlorine.

" **NOTE.**—That the concentration of ammonia in the kettle is approximately 10 parts per million, and the concentration of chlorine 20 parts per million, also that the ammonia and chlorine must be added in the order stated."

HELMY (M. M.). **The Differentiation between Living and Dead Bilharzia Ova.**—*Jl. Egyptian Med. Assoc.* 1930. Nov. Vol. 13. No. 11. p. 550.

Helmy considers that the darkening and shrivelling of schistosome eggs and the loss of definition of their contents are evidence of what he calls "advanced death," and suggests that it would be better to take, as evidence of the passing from life to death, the cessation of movement in the flame cells. The editor claims that these movements can be seen by the expert microscopist only, and points out that the sign is only present while the morphology of the miracidium is still intact. [Satisfactory evidence for death with morphology still intact is surely just what Helmy wants to provide.]

C. L.

CARROSSE. Enquête sur la bilharziose vésicale (*Schistosoma haematobium*) dans le Sud marocain et la région de Marrakech. [*S. haematobium* Infestation in S. Morocco.]—*Arch. Inst. Pasteur d'Algérie.* 1930. Mar. Vol. 8. No. 1. pp. 90-108. With 13 figs. (6 on 3 plates). [14 refs.]

In a paper mainly of local value, and that unfortunately lessened by the author's transfer, it is noted that of 30 local cases of schistosomiasis 15 were in Senegalese soldiers while there were 11 recent infections among Europeans and four among Berber Arabs. From the urines of the last, 8 out of 30 *Bullinus contortus* became infected but *Planorbis metidjensis* remained free as did *Physa subopaca*, *Limnaea ovata*, *Melanopsis chlorotica*, *M. maroccana*, and *Melanoides tuberculatus*. Cercariae from *Bullinus* failed to infect *Mus decumanus*.

C. L.

RYRIE (C. A.) **A Case of Concurrent Leptospirosis and Schistosomiasis in Malaya.**—*Malayan Med. Jl.* 1930 Dec Vol. 5. No. 4. pp. 148-149.

A youth of 18 with acute high fever had been given quinine orally and intramuscularly; he had a total white count of 17,000, increase of large mononuclears, eosinophilia 6 per cent., no leptospira in blood but an injected guineapig later died with signs typical of leptospirosis. His father too having had fever, the son received intramuscularly 30 cc. of his serum and intravenous tartar emetic. Delirium promptly ceased and convalescence set in, but on the third day he passed two pints of urine seemingly pure blood, and the next specimen contained ova of *S. haematobium*. Under treatment with intravenous tartar emetic on alternate days over a month he made an uninterrupted recovery. He had lived in South Africa.

C. L.

MOHAMMED (Abdel Shafi). **Contribution to the Study of Egyptian Schistosomiasis.**—*Ann. Trop. Med. & Parasit.* 1930. Dec. 18. Vol. 24. No. 4. pp. 563-574. With 12 figs. on 3 plates. [7 refs.]

Four cases are described illustrating the proliferative type of schistosome lesion.

1. Subperitoneal papilloma 8 cm. long by 2 cm. wide hanging from the sigmoid with diffuse distribution of *S. mansoni* ova within it, found at post-mortem examination.
2. Multiple tumours in a piece of great omentum containing ova of *S. mansoni*, removed from a hernial sac.
3. Diffuse schistosomiasis of seminal vesicles and vasa deferentia with ova of *S. haematobium*, removed after death.
4. Fibromyoma of the uterus containing ova of *S. mansoni*, removed at operation.

C. L.

BRUMPT (E.) & CHEVALLIER (P.). La rate et les spléno-hépatites des bilharzioses expérimentales. [**Lieno-hepatitis in Experimental Schistosomiasis.**]*—Ann. Parasit. Humaine et Comparée.* 1931. Jan. 1. Vol. 9. No. 1. pp. 15-67. With 16 text figs. & 4 figs. on 1 plate. [48 refs.]

The paper deals with infections of *S. haematobium*, *S. mansoni*, and *S. bovis* in mice, in which they survived from 37 to 369 days, no difference in bodily reaction being noted in the three species. Lesions in mice are nodular [granulique] and toxic. The former occur particularly in the liver, surrounding an egg and are in structure essentially tubercles without caseation but with fibrosis. The latter lesions are caused by adult forms, are not found in the spleen since in mice adults have not been found there though eggs abound, may be so severe as to kill rapidly with necrotic foci, or may be shown merely by a slight endophlebitis. Liver and spleen are held to behave independently, lesions of one not reacting on the other; nor are such conditions as ascites or intestinal haemorrhage held to be caused by either, but to be manifestations of local lesions of intestine and peritoneum. In general, lesions have slight resemblance to those occurring in man, though tubercle formation is identical with that caused by *Myco. tuberculosis* in man. Owing to the almost complete absence of ova in the spleen of man, the splenic condition in mice is not that found in man.

C. L.

RAYNAL (J.). Sur la bilharziose intestinale et sa répartition géographique. [**Intestinal Schistosomiasis and its Geographical Distribution.**]*—Rev. Prat. Malad. des Pays Chauds.* 1930. Aug. Year 9. Vol. 10. No. 8. pp. 347-354, 357-366. [53 refs.]

A review of the whole subject which should be consulted in original.

C. L.

MACIEL (Heraldo). Sobre o emprego da fuadina no tratamento da eschistosomose intestinal. [**Fuadin in the Treatment of Schistosomiasis (*S. mansoni*).**]*—Rev. Med.-Cirurg. do Brasil.* 1931. Feb. Vol. 39. No. 2. pp. 43-52. [2 refs.]

Fuadin, or Heyden 693, is a trivalent antimony compound, containing 13.5 per cent. antimony. It is a white powder but is also on the market as a solution containing 7 per cent. or 0.0085 gm. Sb per cc. It is a modification of antimosan, with 1 per cent. more trivalent antimony.

Animal experiment showed that the toxic dose was far higher than the effective therapeutic dose. Disagreeing with KHALIL and other workers in Egypt, the author states that it has a toxic action on the liver and needs careful watching, but as a rule it was well tolerated. The drug is best administered by deep gluteal injection; the complete course is 10 injections, starting with 1.5 cc., following with one of 3.5 cc. and eight of 5 cc., the first three on successive days, the remainder at 2-day intervals. For children, who bear it well, it is better not to exceed 1 cc. per 10 kilo body weight or a total not above 1 cc. per kilo.

PETER reported 75 cured out of 80 patients, and KHALIL 61.4 per cent. of 2,041 cases. The author gives details of 7, only one of whom showed intolerance, vomiting and prostration. During treatment there is a rapid increase in eosinophiles to 20 per cent. or more, but this returns to normal usually within 60 days after the drug is stopped. In patients not infected with schistosomes injection of the drug caused no rise in these corpuscles.

H. H. S.

SZIDAT (L.) & WIGAND (R.). Ueber Fuadinwirkung bei Bilharziella-Enten. (Parasitologische, klinische und pharmakologische Beobachtungen.) [Action of Fuadin in Bilharziella of the Duck.]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1931. Mar. Vol. 35. No. 3. pp. 159-171. With 5 text figs. [7 refs.] [Pharmacol. Inst. & Med. Clinic, Univ., Königsberg i. Pr.]

It is held that the duck and its Bilharziella is no test object for the action of antimony on bilharzia.

C. L.

OZAWA (Makoto). Experimental Study on the Anemia caused by *Schistosomiasis japonica*.—*Japanese Jl. Experim. Med.* 1931. Feb. 20. Vol. 9. No. 1. pp. 39-45. [8 refs.]

These studies were carried out on 5 healthy adult rabbits who were given a heavy experimental infection with cercariae of *S. japonicum*. The worms began to oviposit about the fifth week. The numbers of erythrocytes and thrombocytes began to fall in the second week, by the fifth week had halved and continued to fall afterwards. Haemoglobin fell in like manner, though the colour index was always less than 1. The numbers of reticulated and polychromatic erythrocytes first rose and then fell. Nucleated red cells first appeared and then disappeared. Leucocytes fell steadily at first, to rise sharply at the 5th week and thereafter rapidly to lessen, eosinophils disappearing suddenly when the case became serious. In the rise at the 5th week large mononuclears took a disproportionate part. In the proximal epiphysis of the humerus there was a marked decrease of nucleated red cells and they were deficient in haemoglobin. Megacaryocytes also decreased or degenerated, as did all cell components. The spleen showed appearance of extra-medullary haemopoietic tissue and atrophy of follicles, the same haemopoietic tissue appearing in liver and lymph glands. The whole is considered as a toxic aplastic anaemia.

C. L.

BERCOVITZ (Z.). Clinical Studies on Human Infestations with the Liver Fluke (*Clonorchis sinensis*).—*Amer. Jl. Trop. Med.* 1931. Jan. Vol. 11. No. 1. pp. 43-60. With 2 figs. [14 refs.] [Presbyterian Mission Hosp., Andong, Korea.]

In these infected Korean patients indigestion and enlarged liver were the commonest symptoms. It is advised that diagnosis should be by

microscopic examination of the second watery stool after magnesium sulphate, and that if ova are not found in a smear salt flotation should be used, which suggests that, unexpectedly, these particular operculated eggs float in it. The point round which the paper is really written is biliary drainage by using the duodenal tube introduced through the mouth and left *in situ* for days. Such a sound removed large quantities of bile, and examination of this showed great variations, as great as an eighteenfold difference in the egg content of the bile in a quarter of an hour. It also removed large numbers of worms and curiously enough relieved night blindness occurring in the infected. Moreover eggs may be absent in the faeces but present in the bile, though whether this is merely a diversion upwards of eggs in one wearing a duodenal tube is not clear. On the other hand several of these drained cases died within a few days of leaving hospital; so that while a certain amount of drainage under careful supervision is held of value in removing toxic materials, the technique should be practised only in hospital and by experts. C. L.

YOSHIDA (Tomokazu). Ueber das Schmarotzen von *Clonorchis sinensis* in dem Pankreas des Menschen. [*Clonorchis sinensis* in the Human Pancreas.]—*Okayama-Igakkai-Zasshi* (Zent. d. Okayama Med. Gesellsch.) 1930 Nov. Vol. 42. No. 11. pp. 2807-2811. [8 refs.] [In Japanese. German summary p. 2812.]

Yoshida reports three cases of hyperinfection with *Clonorchis sinensis* in which the pancreas was infected as well as the liver. There was dilatation and hypertrophy of the pancreatic ducts, and hypertrophy of the connective tissue with atrophy of the glandular cells of the organ. The flukes in the pancreas were mostly in its tail. C. L.

YOSHIMOTO (Seiichi). Untersuchung des Stoffwechsels bei der *Clonorchiasis sinensis*. (*Distomiasis spalthulata* od. *Distomiasis hepatica*.) II. Mitteilung. Experimentelle Untersuchung ueber die Phosphor- und Kalziumausscheidung im Harn bei der Kaninchenclonorchiasis. III. Mitteilung. Experimentelle Untersuchung ueber den Purinstoffwechsel bei der Kaninchenclonorchiasis. [*Metabolism in Clonorchis sinensis Infestation*.]—*Arb. a. d. Med. Univ. Okayama*. 1930. Vol. 2. No. 2. pp. 225-232. [12 refs.]; pp. 267-278. [22 refs.] [Forensic Inst., Med. Univ., Okayama.]

II. In early stages of infection rabbits show no marked change in urinary excretion of calcium or phosphorus. Later these substances increase in parallel fashion, so that shortly before death their quantities are doubled, the result of increased acidity and liver damage.

III. The fat content of the liver is in general lowered by oral or subcutaneous administration of biliary acids, so that fat-splitting in the liver seems to be furthered by bile acids. The respiratory quotient is also lowered. C. L.

YOSHIMOTO (Seiichi). Ueber die Gerinnungszeit des Blutes bei der Kaninchenclonorchiasis. [*Coagulation Time of the Blood in Clonorchiasis of Rabbits*.]—*Okayama-Igakkai-Zasshi* (Zent. d. Okayama med. Gesellsch.). 1931. Feb. Vol. 43. No. 2. pp. 453-458. [31 refs.] [In Japanese. German summary p. 459.] [Forensic Inst., Med. Univ., Okayama.]

In severe clonorchiasis the coagulation time of the blood is lengthened, and this must be a factor in causing bleeding from mucous membranes,

retinal haemorrhage and anaemia. The change is held to be due to the circulation of biliary constituents and to lessening of fibrinogen, blood platelets, thrombokinas and calcium.

C. L.

MAXWELL (James L.). **Paragonimiasis in China. A Preliminary Report.**—*China Med. Jl.* 1931. Jan. Vol. 45. No. 1. pp. 43–49. With 2 plates.

Maxwell reviews the reports of cases of paragonimiasis probably acquired in China. He summarizes the conditions essential for the spread of infection, namely: hilly country, a running stream close to a village with melania and potamon in it, and the habit of eating raw crabs. He found just such an area in the spot from which YING of Shaohing had reported infection. Having brought a travelling microscope he established himself in the dispensary courtyard, examined the sputa of five likely persons by means of such light as the curious crowd would allow, and found paragonimus eggs in two, both women. "It was especially satisfactory to establish the diagnosis in women rather than in men as there was little likelihood of the women having travelled much, and as a matter of fact it was doubtful whether either of them had been far outside the village limits." There is then, it is noted, at least a hint that paragonimiasis may be widespread in China in places where conditions are favourable.

C. L.

GOLOVINE (S.). Un cas de distomatose des poumons. [**Case of Infestation by Lung Fluke.**]—*Rev. Microbiol., Epidémiol. et Parasit.* 1930. Vol. 9. No. 3. pp. 437–439. [In Russian. French summary.]

The author describes a case of *Paragonimus westermanii* infestation of the lungs of a Korean, admitted to the tuberculosis sanatorium in Leningrad. Typical eggs of the trematode were found scattered amongst pus corpuscles in the sputum. The author emphasizes the importance of examining the fresh sputum, since in fixed and stained preparations the eggs could not be detected. The patient in the Far East was in a habit of consuming raw meat, including that of crayfish and crab.

C. A. Hoare.

LIMTSCHER (L. F.) & SANKIN (S. L.). Der zweite Fall von Paragonimiasis in U.S.S.R.] [**The Second Case of Paragonimiasis [recorded] in U.S.S.R.**]—*Zent. f. Bakt.* I. Abt. Orig. 1929. Sept. 18. Vol. 113. No. 7/8. pp. 535–536. [5 refs.]

A Korean of 22 who had just come to Moscow showed paragonimus ova in sputum and faeces.

C. L.

KAMISAKA (T.). **How to differentiate between the Eggs of *Fasciola hepatica* and *Fasciolopsis buski*.**—*Taiwan Igakkai Zasshi (Jl. Med. Assoc. Formosa)*. 1930. Nov. No. 308. [In Japanese. English summary p. 71.] [Govt. Med. College, Taihoku, Formosa.]

Eggs of *Fasciolopsis buskii* may be distinguished from those of *Fasciola hepatica* by the structure of the vitelline cells. The granules

of the former are evenly distributed in each cell so that they are highly refractive with nuclei clearly visible, while in the latter they accumulate round the nuclei giving the cells a dark green or dark brown centre with a very much lighter periphery.

C. L.

HOFFMAN (W. A.). **The Intermediate Host of *Fasciola hepatica* in Porto Rico.**—*Porto Rico Jl. of Public Health & Trop. Med.* 1930. Sept. Vol. 6. No. 1. pp. 89-90. With 1 plate. [4 refs.] [School of Trop. Med., Univ. of Porto Rico, San Juan.]

Cercariae structurally identical with those of *Fasciola hepatica* (which has been reported from man in Cuba, Porto Rico and Venezuela) were yielded by *Lymnea cubensis*, allowed to encyst for about 24 hours and the metacercariae fed to guineapigs. In these animals death took place in 23 to 33 days with young adults of *F. hepatica* in the liver. The work of VOLKENBURG* is thus confirmed.

C. L.

HECKENROTH (F.) & ADVIER (M.). Un cas de distomatose hépatique à *Fasciola hepatica*, en Corse. [**Case of *F. hepatica* Infestation, in Corsica.**]—*Bull. Soc. Path. Exot.* 1931. Jan. 14. Vol. 24. No. 1. pp. 46-49. [2 refs.]

The first case reported from Corsica. There were eggs in the stools but no eosinophilia; complement deviation was negative. Stovarsol was given in tablets, 3 or 4 daily for 4 days with 4 days' interval. The daily total dose is unstated. Under this treatment fever and diarrhoea ceased and the stools, instead of being yellow and watery and 5 or 6 daily, became first pasty and then formed. The man could then eat ordinary food and appeared cured; a few eggs were seen on two later occasions, but none on the last examination.

C. L.

MTSCHEDLIDZÉ (J.). Sur un cas de dicrocoeliose chez l'homme. [**Case of Dicrocoeliasis in Man.**]—*Ann. Parasit. Humaine et Comparée.* 1931. Jan. 1. Vol. 9. No. 1. pp. 68-71. [4 refs.] [Central Trop. Station, Batum, Georgia.]

The faecal examinations which have been made latterly on a grand scale in Russia have disclosed over 100 cases in which the eggs of this parasite have been found in the faeces, though in some they have merely been ingested in infected liver and passed unaltered per anum.

A case is reported in a boy of 9 fed on milk only and examined a number of times with invariable discovery of these eggs. Subcutaneous injections of emetine were given beginning at 0.03 gm. daily and increasing in quantity to an unstated amount. There were three courses each apparently of 4 days with a three days' interval. By the end, the spasmodic abdominal pains with vomiting which had occurred had ceased, an enlarged liver had somewhat diminished and its tenderness lessened. The child was looked on as cured and removed by his parents.

C. L.

* Report of the Porto Rico Agricultural Experiment Station, 1928: 1929. Dec. p. 36.

BLAJIN (A. N.). [**Pseudo-Dicrocoeliasis.**—*Trop. Med. & Veterin.* Moscow. 1930. Vol. 8. No. 2. pp. 11–15. With 5 text figs. [In Russian.]

In view of the alarming number of cases of human infection with *Dicrocoelium lanceolatum* in some parts of Russia, due to increased consumption of liver amongst the poorer classes of the population, the author, working in the Caucasus, has conducted an investigation with the object of discriminating between genuine and spurious infections. The diagnosis was based on the appearance of the ova in stools. In true infections practically all the ova are ripe, whereas the majority of ova coming from infected liver taken as food are undeveloped, and are easily distinguishable from the former. Apart from this, in pseudo-dicrocoeliasis the ova show characteristic alterations due to cooking of the infected liver. The appearance of the different kinds of ova are described and depicted. Their origin can thus be readily established by microscopic examination of suspected stools.

C. A. Hoare.

[This is in contrast to the statement of KOULAGUINE (*Russian Journal of Tropical Medicine*, 1929, Vol 7, p. 135) that even when the liver containing them has been boiled, roasted or baked, the eggs which it contained appear unaltered in the faeces.—C. L.]

SKRJABIN (K. J.) & PODJAPOLSKAJA (W. P.). *Nanophyetus schikhobalowi* n. sp. Ein neuer Trematode aus dem Darm des Menschen. [**A New Trematode from Human Gut.**—*Zent. f. Bakt.* I. Abt. Orig. 1931. Jan. 20. Vol. 119. No. 5/6. pp. 294–297. With 3 text figs. [4 refs.] [*Trop. Inst.*, Moscow.]

In the Amur and Usuri regions faecal examinations of men showed an operculated egg with a thickening at the opposite pole, 0.065 to 0.072 mm. long by 0.004 to 0.048 mm. broad. Thymol, 5 gm. given once, produced two species of trematodes, one *Metagonimus yokogawai*, the other 0.5 mm. long and believed to be a new *Nanophyetus* and named *N. schikhobalowi*, which is described and differentiated.

C. L.

TUBANGUI (Marcos A.). **Trematode Parasites of Philippine Vertebrates, II : Two Echinostome Flukes from Rats.**—*Philippine Jl. Sci.* 1931. Mar. Vol. 44. No. 3. pp. 273–283. With 2 plates. [10 refs.] [Bureau of Science, Manila.]

Twenty-one specimens of *Euparyphium ilocanum* reported by GARRISON from man have been found in a rat, as has a new species *Euparyphium guerreroi*.
C. L.

BONANNO (A. M.). Le comportement de quelques réactions biologiques dans l'échinococcose après l'intervention chirurgicale. [**Biological Reactions after Operation in Hydatid Disease.**—*Boll. Sezione Ital., Soc. Internat. di Microbiologia.* Milan. 1931. Mar. Vol. 3. No. 3. pp. 67–68. [*Inst. of Bact. & Immunol.*, Royal Univ., Turin.]

Bonanno does not agree that persistence of biological reactions after surgical intervention in hydatid disease implies the presence of another cyst. It has not, he holds, been demonstrated that these reactions

must disappear when antigens cease to enter the circulation; indeed he thinks that this happening is excluded by immuno-biological theory. The disappearance of these reactions is progressive, first the haemoclastic reaction of d'Amato (lessening of the red corpuscles within an hour of intradermal injection of hydatid fluid), next eosinophilia, then the Ghedini-Weinberg reaction, and lastly that of Casoni. The last two may persist for 5 to 7 years. He is strengthened in his opinion by his failure to find a hydatid of the liver in spite of several punctures when the abdomen had been opened a second time in a case showing such reactions.

C. L.

- i. CROSTE (René). Un cas d'échinococose secondaire guéri par le stibyal. [**Recovery of a Case of Secondary Echinococcosis after Treatment by Stibyal.**]—*Ann. Parasit. Humaine et Comparée*. 1930. July 1. Vol. 8. No. 3-4. pp. 450-451. [Civil Hosp., Bayonne.]
- ii. DÉVÉ (F.). A propos du traitement de l'échinococose par l'émétique. [**Treatment of Hydatid by Tartar Emetic.**]—*Ibid.* 1930. Oct. 1. Vol. 8. No. 5. pp. 566-568. [14 refs.]

i. In a region (Bayonne) where hydatid is not rare, a woman of 40 had a subhepatic tumour which suddenly disappeared with slight pain. It was a hydatid which ruptured and sowed the whole peritoneum with scolices with the result that from time to time she suffered thirteen laparotomies and came to look on one as all in the day's work. At these, 20 large cysts were removed and in addition hundreds strewn over the peritoneum were destroyed by thermocautery. Latterly stibyal, 1.8 gm. in all, was given. Apparently since then, at all events during the last five years, no further interference has been needed and Croste believes that the drug was concerned in the cure.

ii. Commenting on CROSTE's case, Dévé notes that spontaneous cure of hydatid has not been taken sufficiently into consideration; and that in 5 of 6 reported cases (Hamilton FAIRLEY and DEW each 2, CAWSTON and GARIN each 1) the parasitocidal effect of tartar emetic, whether the potassium or sodium salt, has been exactly nil.

C. L.

GOODALE (Raymond H.). **Hydatid Cyst of the Brain.**—*Amer. Jl. Trop. Med.* 1931. Jan. Vol. 11. No. 1. pp. 61-64. With 1 text fig. [3 refs.] [Path. Dept., Amer. Univ., Beirut.]

An Englishman, who had had penile ulcer 4 years earlier, had headache, vomiting, some oedema of the left optic papilla, unsteady gait, a positive Babinski reaction and increased ankle and knee jerks; Wassermann strongly positive. He improved under neosalvarsan and mercury, but on the 24th day died in convulsions. A hydatid cyst 6 cm. in diameter containing degenerated scolices lay in the right parietal region.

C. L.

BROUGHTON-ALCOCK (W.) & WEINBREN (M.). **Generalized Infection of Muscles with *Cysticercus cellulosae*; Measurements of Cysts and Comparison with those of *Trichinella spiralis*.**—*Proc. Roy. Soc. Med.* 1930. Dec. Vol. 24. No. 2. pp. 222-224 (Sect. Trop. Dis. & Parasit. pp. 6-8). With 2 text figs. [1 ref.]

A radiogram taken of a knee injured by a gunshot showed calcified *Cysticercus cellulosae* about $\frac{1}{4}$ in. [6 mm.] long in the muscles. LEIPER

arranged with Sir Arthur KEITH that a radiogram from a specimen of trichinosed muscle from the College of Surgeons museum should also be taken with its calcified cysts 0.4 mm. diameter. The two figures illustrate the two appearances.

C. L.

KOBAYASHI (Hidekazu). **Studies on the Development of *Diphyllobothrium mansonii*** Cobbold, 1882 (Joyeux, 1928). II. **On the Conditions of Development of the Eggs of *Diphyllobothrium mansonii*.**—*Taiwan Igakkai Zasshi (Jl. Med. Assoc. Formosa)*. 1930. Oct. No. 307. [In Japanese. English summary pp. 61-62.]

——. **Correction and Additional Observation on the Propagatory Cells relating to my Paper on "Embryonal Development in the Egg of *Diphyllobothrium mansonii*."**—*Ibid.* [In Japanese. English summary p. 63.] [Govt. Med. College, Taihoku, Formosa.]

The optimum temperature is 24° C. to 28° C., and in Taihoku, Formosa, [natural] hatching shows a high rate from June to September. The lower and upper limits are 15° C. and 40° C. Eggs are easily poisoned and alkalis are less harmful than acids; darkness and direct sunlight lower the rate of development remarkably, as does the presence of much faecal matter. Drying stops development. Under the head "toxicity" appears: "A hypertonic medium tends to prevent development; also heavy water pressure prevents the development."

C. L.

KOBAYASHI (Hidekazu). **Studies on the Development of *Diphyllobothrium mansonii*** (Cobbold, 1882) Joyeux, 1927. (Third Report.) **Experimental Studies on the Mode of Infection by the Mature Proceroid.**—*Taiwan Igakkai Zasshi (Jl. Med. Assoc. Formosa)*. 1931. Jan. Vol. 30. No. 1 (310). [In Japanese. With 31 figs. on 2 plates. English summary pp. 3-8.] [Govt. Med. College, Taihoku, Formosa, Japan.]

The mode of infection of the second intermediate host was studied. In oral infection of the frog larvae enter the body cavity from the alimentary canal, "move into the chest cavity through the diaphragm," enter muscles and have then a tendency to pass back into the femoral muscles; in infection of the mouse the tendency is to move forwards to the neck. Infection can occur through the mucous membrane of the vagina and conjunctiva in the mouse, and through its injured, blistered or healthy skin, in the last case more easily in the young animal. On his own skin (age 28) Kobayashi produced evidence of penetration with itching and a wide halo of redness. Excision of the affected skin and subcutaneous tissue revealed 3 plerocercoids lying in tunnels in the dermis and subdermis. Later two further excisions of hard roundish painless pieces of subcutaneous tissue revealed plerocercoids, the second 47 days after infection.

C. L.

KOBAYASHI (Hidekazu). **Studies on the Development of *Diphyllbothrium mansonii* Cobbold 1882, (Joyeux, 1927). (Fourth Report.) Hatching of the Egg, Onchosphaera and Discarding of the Ciliar Coat.**—*Taiwan Igakkai Zasshi* (Jl. Med. Assoc. Formosa). 1931. Feb. Vol. 30. No. 2 (311). pp. 133–147. With 19 figs. on 1 plate. [In Japanese. English summary pp. 15–16.] [Govt. Med. College, Taihoku, Formosa.]

A hatched onchosphere rises to within a few millimetres of the surface and swims there for 2 or 3 hours mainly with counter-clockwise rolling, though from what aspect viewed is not stated. This is the period of infectivity. In effecting penetration of a host the larva by means of its hooks first tears its way out of the onchosphere through the ciliate membrane.

C. L.

BONNE (C.). Een zonderlinge Sparganum infectie. [**A Peculiar Sparganum Infection.**]—*Geneesk Tijdschr. v. Nederl.-Indië*. 1930. Dec. 1. Vol. 70. No. 12. pp. 1235–1238. With 2 figs. on 1 plate. [Med. High School, Batavia, Java.]

The post-mortem examination of a lunatic Malay man of 35 showed the existence of a large haemorrhagic infarct of the right lung, a local fibrinous peritonitis round the ascending colon, some smaller haemorrhagic and anaemic infarcts in the kidneys and some cerebral haemorrhage.

In the arteries of the infarcted part of the right lung pieces were found (partly dead, partly living, and one carrying the head) apparently of one individual of *Sparganum mansonii* (or at least of a closely related species), the larval stage of *Diphyllbothrium mansonii*. It is likely that the pathological findings are to be ascribed to the presence of the worm, no other causes being found.

Apart from the rarity of man being the intermediate host of this tapeworm, the localization in the lung is very peculiar, but it may be accounted for by the presence of an open foramen ovale in the patient's heart.

W. J. Bais.

VERGEER (Teunis). **Causes underlying Increased Incidence of Broad Tapeworm in Man in North America.**—*Jl. Amer. Med. Assoc.* 1930. Nov. 22. Vol. 95. No. 21. pp. 1579–1581. [9 refs.] [Zool Dept., Univ. of Michigan, Ann Arbor.]

"Investigation has demonstrated that dogs in the region extending from Ely, Minn., north into Canada are heavily infested with *Diphyllbothrium latum*, the broad tapeworm of man, and are largely responsible for the continued infestation of fish with the larvae, which may develop in man.

"Numerous eggs typical of those of *D. latum* were found in four of ten samples of feces of wild bears.

"Dogs and wild carnivora may cause the further distribution of this parasite into uninhabited, as well as heavily settled, regions in North America."

C. L.

MILLER (Harry M.), Jr. **Immunity of the White Rat to Superinfestation with *Cysticercus fasciolaris*.**—*Proc. Soc. Experim. Biol. & Med.* 1931. Feb. Vol. 28. No. 5. pp. 467-468. [2 refs.] [Zool. Dept., Univ., Washington.]

This paper continues a line of investigation already noted (*ante*, p. 205, last sentence of abstract). Rats were fed on onchospheres, and a like feast was repeated after six months. The onchospheres of the second feeding did not grow in the already infected rats, but did so readily in controls.

C. L.

LOEPER (M.) & TONNET (J.). Production d'acide oxalique par le taenia. [**Production of Oxalic Acid by Tapeworm.**]—*C.R. Soc. Biol.* 1931. Mar. 13. Vol. 106. No. 9. pp. 716-717. [1 ref.]

In cultures of *Bact. coli*, moulds, fungi and yeasts, oxalic acid is often produced from glycogen or sugar. BRAULT and LOEPER showed 30 years ago that tapeworms were rich in glycogen; the present authors now show that when a tapeworm is kept for 24 hours in an incubator the glycogen gives place to glucose and oxalic acid. The last combines with the calcium, so abundant in these worms, to form crystals of calcium oxalate.

C. L.

FAIRLEY (N. Hamilton). **Serological and Intradermal Tests in Filariasis. A Preliminary Report.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1931. Apr. 25. Vol. 24. No. 6. pp. 635-648. [11 refs.]

The antigen used was *Dirofilaria immitis* collected, washed and dried by LE SUEUR of Sarawak, it being estimated that 1 gm. contained 250 to 300 worms. For the complement fixation test, preliminary experiments having indicated that alcoholic was more potent than saline extract of the antigen, the former was used throughout those here recorded. The paper describes exactly the routine technique used, the standardization of antigen, and the method of setting up the test. Of 70 sera examined 59 were negative. These included 2 of hepatic echinococcosis, 2 of schistosomiasis, infections with taenia, ascaris, hookworm, trichuris and clonorchis, as also three old cases of *F. bancrofti* infestation. The 11 positives are considered below. The intradermal skin tests were begun quite independently, but strikingly confirm those of TALIAFERRO and HOFFMAN (*ante*, p. 214). The technique is that which Fairley has used for schistosoma and hydatid, and as regards detail he now injects 0.25 cc. of a 0.1 per cent. saline extract of dirofilaria powder, which dosage brings into line the tests on all three parasitic groups and makes them comparable. Large doses may be dangerous. Thus Case No. 8 after receiving 0.25 cc. of a 1 per cent. saline extract collapsed with anaphylactic shock, but recovered. The intradermal reaction is of two kinds: immediate, with diffuse erythema and a rapidly increasing wheal with peripheral pseudopodia-like outrunners reaching a maximum diameter within thirty minutes of 2.3 cm.; delayed, with deep blubbery swelling 4 to 7 cm. long and 1 to 3 cm. deep, beginning in 1 to 4 hours, and reaching a maximum next day when it may involve a considerable part of the arm and produce stiffness, heaviness and tension.

The table, which has been compiled from the paper, makes it clear that both tests were positive in six cases of active loiasis, in one of

Case.	Filaria concerned.	Complement fixation test.	Intra-dermal skin test.	Notes.
1	<i>L. loa</i> ...	+	+	Actively infected: from West Coast of Africa.
2	<i>L. loa</i> ...	+	+	" "
3	<i>L. loa</i> ...	+	+	" "
4	<i>L. loa</i> ...	+	+	" "
5	<i>L. loa</i> ...	+	+	" "
6	<i>L. loa</i> ...	+	+	" "
7	<i>F. bancrofti</i> ...	+	+	30 years' residence in Calcutta. Operation for right hydrocele and hernia 1913; left hydrocele 1930, fluid swarming with <i>Mf. bancrofti</i> . Now no microfilariæ in night blood. Eosinophilia 6 per cent.
8	<i>F. bancrofti</i> ...	—	+	Indian from Calcutta. Hydrocele and mass involving right spermatic cord. Painful swellings along left and right basilic veins. Excision of last showed a degenerating filaria. No microfilariæ in night blood. Eosinophils 5 per cent.
9	<i>F. bancrofti</i> ...	—	+	Missionary from Samoa. Elephantoid fever diagnosed by Manson in 1900. Left testis removed at operation showed a calcified filaria in the tunica vaginalis. No microfilariæ.
10	—	+	+	Indian suffering from kala azar.
11	—	+	—	Gastric carcinoma. Resided in endemic area for many years. No clinical signs. No microfilariæ.
12	<i>O. volvulus</i> ...	±	+	Nodule recently removed containing adult male and female worms.
13	<i>F. bancrofti</i> ...	—	+	European from Calcutta. Lymphangitis last year and microfilariæ then reported. None now. Eosinophilia 1 per cent.
14	—	+	+	West Indian with latent syphilis. Long residence in endemic area.

unquestioned infection with *F. bancrofti*, in two men who had lived in endemic areas but had no clear evidence of filariasis, and partly positive in a case of onchocerciasis after removal of a nodule. The complement fixation test was negative and the intradermal test positive in three undoubted cases of filariasis [perhaps no longer with living worms]; while the reverse was the case in a gastric carcinoma patient who was assumed to be infected by reason of the positive complement fixation.

"The tests themselves appear mutually complementary, since the complement fixation reaction detects circulating antibody and affords an index to more active infestation, while the intradermal test taps residual intracellular antibody which may persist long after circulating antibody and the parasites themselves have disappeared."

"The delayed reaction obviously arises from a progressively increasing oedema of the subcutaneous tissues radiating outwards from the site of injection, and probably depends on extensive vascular dilatation and increased permeability of its vessels caused by "H substance." This phase of the reaction is the one producing appearances so closely akin to Calabar swellings, and the available evidence certainly supports Fülleborn's view in regarding Calabar swelling as an example of localised anaphylaxis."

C. L.

O'CONNOR (F. W.). **Filarial Periodicity, with Observations on the Mechanism of the Migration of the Microfilariae from the Parent Worm to the Blood Stream.**—*Porto Rico Jl. of Public Health & Trop. Med.* 1931. Mar. Vol. 6. No. 3. pp. 263-272. With 12 plates. [3 refs.] [College of Physicians & Surgeons, Columbia Univ., New York, & School of Trop. Med., San Juan, Porto Rico.]

The title of this paper shows the two subjects with which it deals.

Regarding filarial periodicity O'Connor describes a specimen of testis and cord, with hydrocele, which had been forwarded to him after removal at 5 p.m. from a Porto Rican who had died 6 to 12 hours earlier. The lymphatics were much dilated and hypertrophied, indicating intra-abdominal lymphatic obstruction. Eight adult *Filaria bancrofti* were found after sectioning most of the specimen. Only one was free from calcification, a female with morphology clearly made out, containing no microfilariae but with the posterior two-thirds of the uterus full of non-embryonated eggs. The only place in the body* where microfilariae were found was a zone beginning half an inch above the only living adult and extending upwards for one and a half inches. This is a point of fact, not of interpretation. The conclusion is: "Histological studies suggest that the hypothesis of Clayton Lane to the effect that the phenomenon of filarial periodicity is due to a simultaneous cyclical parturition of the gravid female filaria is correct."

Regarding the mechanism of migration, O'Connor reports microfilariae in the thickness of the wall of the lymphatics and in every phase of transit through it "just leaving the lumen, in the thickness of the wall entering the blood vessels in the wall and entering the blood vessels outside the adventitia. . . . The sheath could be made out

* "Careful studies made later of sections from all organs of the body failed to reveal any parasites in the blood vessels of the general circulation."

in some sections and in a few it seemed to be enlarged or ballooned anteriorly. . . . While many parasites were still present in the walls of the lymphatics the overwhelming majority were in the adjacent blood vessels." The findings then are interpreted as showing that microfilariae, although enclosed in sheaths, progress through the tissues [see ACTON and RAO *infra*]. It is suggested that in the periodic form of Porto Rico filariasis parturition is diurnal, taking place about 2 p.m., and that microfilariae remain in the local small arteries till they migrate thence to the general circulation about 6 p.m.

C. L.

ACTON (Hugh W.) & RAO (S. Sundar). **The Diagnosis of Lymphatic Obstruction of Filarial Origin.**—*Indian Med. Gaz.* 1931. Jan. Vol. 66. No. 1. pp. 11–17. With 1 map & 12 figs. on 4 plates. [5 refs.]

This paper on the clinical aspects of filarial obstruction is called forth largely as a protest to pontifical statements made by self-constituted experts with a few months' experience, at the healthiest time of year, of an endemic area. It is pointed out that 8 to 20 or more years' residence in an endemic area is needed before lymphatic obstruction is produced, that immunity of Europeans is not racial but a matter of sanitation and habits, and that microfilariae are as a rule not present in the blood in advanced lymphatic obstruction, but that they may frequently be found from lymph oozing below a lymphatic obstruction when the peripheral blood contains none. It is definitely held that "the microfilaria is in a sheath, is born in the lymphatics and has no power of penetrating through the tissues" [see O'CONNOR *supra*], and it is pointed out that it cannot be accepted that pitting on pressure is absent in the early stages of lymphatic obstruction. The conditions considered as likely to be confused clinically with this last are: Diffuse fibromatosis (dermatolysis) a late and rare stage of von Recklinghausen's syndrome and depicted in text books of tropical medicine as elephantiasis of scalp, face, buttock, or leg; giant urticaria usually traceable to diet, having an eosinophilia of 16 to 60 per cent., much higher than that of filarial obstruction; hypopituitarism with adiposity, the posterior pituitary lobe also being often involved with lack of pressor substances and static oedema; elephantiasis nostras of which white leg is held to be largely a synonym; removal or destruction of lymphatic glands; and macrogymnastia.

C. L.

MATHIEU. Un cas de filariose. [**Case of Filariasis.**]—*Bull. Soc. Méd. Chir. Indochine.* 1930. July. Vol. 8. No. 7. pp. 731–733.

A case of varicose groin lymphatics disappearing on resting, hydrocele, and *Mf. bancrofti* in the night blood, in a man who had never left Luang-Prabang, Laos, French Indo-China.

C. L.

MALDONADO MALDONADO (Antonio). Un caso clínico de "Filaria loa" con extracción de un parásito adulto, observado en un individuo procedente de Fernando Póo. [**A Case of Infection by *Loa loa* from Fernando Po.**]—*Medicina Paises Cálidos.* Madrid. 1930. Nov. Vol. 3. No. 6. pp. 534–536.

A man of 37 years who probably contracted infection in 1917 in Fernando Po. No symptoms appeared till 4 years later when the worm made itself

evident in the left eye. On extraction it was found to measure 3.25 cm. in length. The blood showed marked eosinophilia and embryos. After the extraction, all the symptoms cleared up. [The degree of eosinophilia is not stated, nor the hour at which the blood was taken for examination.]
H. H. S.

SKRJABIN (K. I.), ALTHAUSEN (A. J.) & SCHULMAN (E. S.). [**First Case of *Dirofilaria repens* from Man.**].—*Trop. Med. & Veterin.* Moscow. 1930. Vol. 8. No. 2. pp. 9–11. With 4 text figs. [In Russian.]

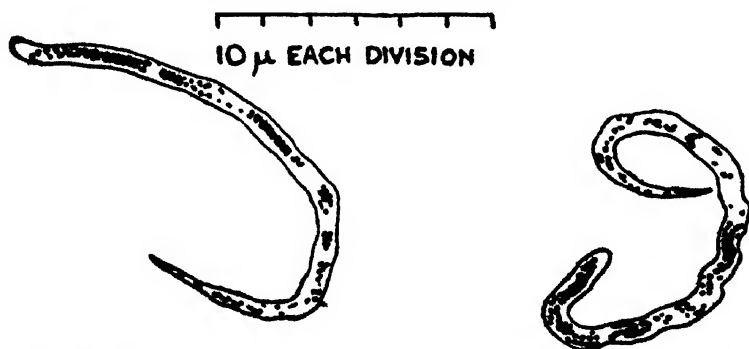
The authors describe a case in which *Dirofilaria repens* ♂ was extracted from a subcutaneous nodule of the right lower eye-lid of a woman. From the history of the case it appears that the patient's child accidentally hit her in the right eye with a stick, with the result that conjunctivitis and later the tumour developed. The worm was identical with the nematode occurring in dogs. Figures are given showing the parasite in natural size, its anterior and posterior ends, and a section of the tumour in which it was found. The histology of the nodule is described.

C. A. Hoare.

RAO (S. Sunder). **New Species of Human Microfilaria (*Microfilaria actoni* sp. nov.) from Eastern India allied to *Microfilaria* of *Acanthocheilonema perstans*.**—*Indian Jl. Med. Res.* 1931. Jan. Vol. 18. No. 3. pp. 979–981. With 1 plate. [3 refs.]

A single slide from a convict released before the slide was examined and thereafter suspiciously refusing to be re-examined, showed these peculiar microfilariae:

"The microfilariae are devoid of any sheath. They have a rounded head-end and tail-end which tapers to a fine point. The embryos are 140μ to 150μ long averaging about 145μ . The maximum breadth of the body, at about the nerve-ring, is 6μ . The body tapers slightly towards the anterior end and the breadth at the tip is 5μ . The nuclei commence some short distance behind the anterior end of the worm, first in two rows, and more posteriorly there is dense aggregation of nuclei up to the nerve-ring. There is a sharp break at the nerve-ring, and then posterior to it for a short length, the nuclei are densely packed. After about one-third to half the length of the microfilaria, the nuclei are less dense and irregularly distributed. The distance from the anterior end to the nerve-ring is 30μ or one-fifth of the length of the embryo. The tail-end of the



Microfilaria actoni sp. nov. Camera lucida drawings of microfilaria stained with haematoxylin and eosin.

[Reproduced from the *Indian Journal of Medical Research*.]

microfilaria is very characteristic. The tail tapers to a fine point, the nuclei occurring to nearly the extreme tip of the tail. These nuclei of the tail are long and rod-like and there results a chain of three (sometimes two or four) rod-like nuclei extending to the tip of the tail. Another feature of this microfilaria is the absence of the central viscus (Innenkörper)."

C. L.

OCHOTERENA (I.). Contribuciones para el conocimiento de la onchocercosis en Mexico. V. Nota acerca del fototactismo de las microfilarias de *Onchocerca volvulus caecutiens*. [**Onchocerciasis in Mexico : V. Phototropism of the Embryos of *O. caecutiens*.**—*An. Inst. Biol. Univ. Nac. Mexico*. 1930. Vol. 1. No. 4. pp. 307-308. With 1 text fig.

Noting the abundance of embryos of *O. caecutiens* in the anterior part of the cornea and their diminution in the more posterior parts of the eye the author devised an experiment to test the reason of this and whether phototropism was responsible. He removed a tumour containing a large number of embryos, placed some in Ringer's solution on a slide, the area being shut off by vaseline, and then directed a beam of light on to the slide whereby a central area could be observed with its penumbra and umbra. Two observations were made: in a short time in the first there were 8 embryos in the light zone, one and three respectively in the penumbra and umbra; in the second with a thicker emulsion there were 14 in the light and two in each of the other zones. The author concludes that phototropism or, as he calls it, phototactism plays a part in determining the localization of the embryos.

H. H. S.

OCHOTERENA (I.). VI. Estudio anatomico de la microfilaria de *Onchocerca volvulus caecutiens* por medio de las coloraciones vitales. [**VI. Anatomical Study of Embryos of *O. caecutiens* by Means of Vital Staining.**—*An. Inst. Biol. Univ. Nac. Mexico*. 1930. Vol. 1. No. 4. pp. 309-311. With 3 text figs.

A method of comparing various filarial embryos by vital staining and noting the positions of the structures. Thus in the embryo of *O. caecutiens*, starting from the head, the non-nucleated portion occupies 5.1 per cent. of the total length, the pre-nervous region 24.2, the nervous ring is 25.7 from the head and occupies 1.6 per cent., the excretory pore is 34.5 per cent., the cells of Rodenwalt 63 per cent., the anal pore 90, and the nuclear column ends at 95. Analogous measurements being made with other embryos, the whole can be plotted for comparison. As stains the author used carbol methylene blue, neutral red, methyl green pyronin prepared by Gruebler.

H. H. S.

HOFFMANN (Carlos C.). Los simulidos de la region onchocercosa de Chiapas (con descripcion de nuevas especies). [**Simuliidae of the *Onchocerca* Region of Chiapas.**—*An. Inst. Biol. Univ. Nac. Mexico*. 1930. Vol. 1. No. 4. pp. 293-306. With 15 text figs.

Onchocerciasis is endemic in the south of the State of Chiapas and the author has considered that for future investigators it would be

useful to know what species of Simuliidae are to be found there. He describes the morphology of three species of *Simulium*, viz., *S. avidum*, *S. virgatum* and a new species *S. pseudohaematopotum*, and three of *Eusimulium*, *E. ochraceum*, *E. mooseri* and a new species *E. turgidum*. The description is presented in the form of a table so that the various species may be compared and contrasted.

H. H. S.

DAVIS (L. J.). **A Note on Some Experiments with Agents Lethal to Cyclops.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1931. Apr. 25. Vol. 24. No. 6. pp. 631–633. [4 refs.] [Wellcome Trop. Research Labs., Khartoum.]

Laboratory experiments were made as to the lethal effects in varying concentration of caustic soda, caustic potash, hydrochloric acid, bleaching powder, potassium permanganate, quicklime, builders' slaked lime, and sodium bicarbonate; and the pH of the solution was tested in every case. A pH of 10 or more was lethal in all cases, this being just about the point where red litmus paper turns blue, and is conveniently produced by adding quicklime or ordinary lime in a strength of 1 in 1,000. [Presumably it was 0.1 cc. of N/1 caustic soda and not 9.1 cc. which produced a pH of 8 in 500 cc. of water.]

C. L.

BOTREAU-ROUSSEL & HUARD (P.). **Arthrites puriformes aseptiques dans la draconculose chez le noir.** [**Aseptic Purulent Arthritis in Dracontiasis.**]—*Bull. Soc. Path. Exot.* 1930. Dec. 10. Vol. 23. No. 10. pp. 1020–1025.

These authors draw attention to the insufficiently realized damage to the knee which the presence near it of a guineaworm may cause (see PRADHAN, above, p. 220), but they insist that, although in these cases the joint contains pus, it is always in their experience sterile pus, and that aspiration suffices in the matter of surgical interference. Of suggested causes of this purulent arthritis, namely the presence of a worm in the joint, arthritis due to worm toxins, a communication between the joint and a neighbouring filarial abscess, and synovial reaction due to proximity of a focus of pus, they favour the last.

C. L.

CHUKERBUTI (J. C.). **Eosinophilia in Dracontiasis.**—*Indian Med. Gaz.* 1931. Jan. Vol. 66. No. 1. pp. 21–22.

The author reports on over 30 cases of dracontiasis.

Both the normal Leishman stain and the author's "field" modification which dispenses with distilled water, "showed in all the cases a striking alteration of the eosinophilic nature of the granules into different shades of basophilic colour. They look every bit like eosinophiles in all other characteristics. This basophilic tendency of the granules shown by different shades of blue gradually gets deeper and deeper from the time of penetration of the stomach wall by the infective larva to the ultimate selective settlement of the mature gravid female worm somewhere in the subcutaneous connective tissue.

"As soon as the worm dies in the body or is extracted by surgical procedure, the basophilic tendency of the granules diminishes in intensity, until in three or four weeks time the cells regain the normal eosinophilic nature of their granules, though their percentage remains high for two or three months." Presumably the conclusion rests on the final appearance and death of a guineaworm.

C. L.

CEYLON. Report of the Superintendent, Ankylostomiasis Campaigns, for the Year 1929 [KURIYAN (A. T.)].—*Ceylon Administration Rep. Director Med. & San. Services, 1929.* Appendix pp. C 54–C 60. With 2 maps.

During 1929, 20,856 faecal specimens were examined, having reached the central laboratory in tins, and two slides per specimen were gone over by Stoll's technique. If negative to this Willis's direct gravity floatation technique was used also. The eggs per gram averaged 656 and the percentage infected so found was 85.5. Fifteen days after treatment by oil of chenopodium or carbon tetrachloride in unstated general dosage, 2,574 were re-examined giving an average egg count of 332 and a percentage of infection of at least 59.7. Again, of 23,911 persons examined 97.5 per cent. had some infection or other; 2,891 were re-examined after treatment and 91 per cent. were still infected. A re-survey of over 7,000 persons from districts treated 12 months earlier gave interesting results. The first egg count had given an average of 722 eggs per gram with about 89 per cent. of infected persons, while on examination after treatment the average eggs per gram were 246 and the percentage of still infected about 54. Re-survey a year later gave an average egg count of 619 and an average percentage of infection of about 85. By both series of tests, then, treatment seems to have done nothing towards the radical control of hookworm infection. Nevertheless the following occurs:

"The Director of Medical and Sanitary Services in his annual report for 1928 states:—'The results of the Ankylostomiasis Campaign are now beginning to show themselves. It is very encouraging to record that in some districts of the Central Province the treatment has been so successful that overcrowding of hospitals no longer exists, and in fact some of the wards in Dikoya, Dimbula, Lindula, Maskeliya, Bogawantalawa, and Agrapatna hospitals are almost empty for the greater part of the year.'

"Some of the hospitals and dispensaries in the Island are standing monuments of the primitive sanitary habits of the communities they serve. The present rate of progress of hookworm control is so marked that the day may not be far off when they may be closed for the treatment of the sick."

It is difficult to consider the two sets of facts as necessarily interconnected. Apart from these mass treatments very many received herd treatments during 1929.

C. L.

PALMERLEE (C. A.). Hookworm Infestation in Mississippi.—*New Orleans Med. & Surg. Jl.* 1931. Feb. Vol. 83. No. 8. pp. 534–536.

Using "the brine flotation" method, 3,250 stools of patients in hospital are reported on and 15.2 per cent. showed necator infection;

percentage of infection by age was 31 for children under 10, 33 for children over 10, and 12.5 for adults. The percentage of infection in appendicitis was by far the highest [the actual figures are not given]. Treatment in 1928 was by chenopodium, four treatments ten days apart, "the dosage per age was according to the directions on the manufacturer's scale." A year later 69, whether still inmates or not is unstated, were re-examined and 39 or 57 per cent. still had ova. Treatment in 1929 was by "three doses of carbon tetrachloride per treatment, for four treatments ten days apart." A year later 80 were still in the institution [and so presumably could not have been reinfected] and 51 or 64 per cent. still showed ova. This year tetrachloroethylene is being tried.

C. L.

PENSO (Giuseppe). Studi sull' anchilostomiasi. Ia Memoria. Sopra un nuovo meccanismo di infestazione degli sclerostomidi. [*Studies on Ankylostomiasis. I. A New Mode of Infestation by Sclerostomidae.*]—*Ann. di Med. Nav. e Colon.* 1931. Jan.-Feb. Year 37. Vol. 1. No. 1-2. pp. 24-27. With 2 figs. on 1 plate. [5 refs.] [Inst. of Med. Parasit., Univ., Rome.]

The author mentions the usual mode of hookworm infestation by skin penetration as described by LOOSS, and that recorded by ALESSANDRINI of ingestion of the larvae by flies and the passage of them still viable in the insects' faeces. He here notes in a culture the penetration of the root and root fibres of vegetable plants and states that they may lie for a period of days in this position, being kept alive by the moisture present. Such vegetables eaten raw might result in the penetration of the buccal or pharyngeal mucosa by the larvae and their reaching the blood stream in this way. This would explain sporadic infection in individuals who had never lived in an endemic area, the infected vegetables having been transported to the new district. [Presumably, the possible presence of free living nematodes and their larvae had been excluded.]

[ALESSANDRINI'S original paper is not easy to understand since he seems to conclude that young, and so presumably rhabditiform, larvae can penetrate the gut of maggots. It seems, however, that thigmotropism has never been observed in them. Penso's microphotographs show larvae within rootlets, but Dr. Scott's comment is well founded since these larvae seem definitely to correspond to mature hookworm larvae neither in shape nor appearance, while one at least recalls a type of larva of free living nematodes which is commonly seen in unsterilized earth cultures.—C. L.]

H. H. S.

MANGIOLA (Marco). Un caso di anchilostomiasi simulante un neoplasma gastrico. [*Ankylostomiasis simulating New Growth of Stomach.*]—*Policlinico. Sez. Prat.* 1931. Apr. 20. Vol. 38. No. 16. pp. 550-551. [7 refs.]

An excellent example of the adage which every research worker bears constantly in mind: "Be very careful when you are looking for something or you will be sure to find it." A man of 65 years, living in Calabria, complained of vague abdominal pain and weakness for three months. He was pallid and cachectic and a diffuse sense of resistance to palpation over the pylorus [? muscular] was noticed and malignant disease naturally suspected.

An X-ray examination resulted in a report, "pyloric stenosis of the second degree of neoplastic nature." He had never suffered from vomiting and took food without discomfort. Faecal examination revealed ova of hookworm in large numbers together with those of trichurias. Complete cure followed the use of carbon tetrachloride. The diagnostic error is, perhaps, more excusable if, as the author states, "ankylostomiasis is absolutely unknown in the country" (Calabria).

["Hookworm disease is distributed over the whole of Italy, Sicily and Sardinia. It is found chiefly among farm hands, clay workers and miners." Hookworm Infection in Foreign Countries—Publication No. 6. The Rockefeller Sanitary Commission for the Eradication of Hookworm-Disease. 1911. C. L.]

H. H. S.

ARCHER (Vincent W.) & PETERSON (Charles H.). **Roentgen Diagnosis of Ascariasis.**—*Jl. Amer. Med. Assoc.* 1930. Dec. 13. Vol. 95. No. 24. pp. 1819-1821. With 3 text figs. [14 refs.]

Interest in this subject dates from work by Otto FRITZ in 1922. The appearances described are: first and soon after ingestion of a barium meal a cylindrical filling defect in the jejunum, and later a string-like shadow representing the barium-filled alimentary canal of the ascarids. "The parasites will not ingest the barium if the patient has eaten prior to drinking the contrast meal." In discussion Dr. Eugene P. PENDERGRASS pointed out how easy the ascaris eggs were of identification by the microscope, and Dr. Archer replied that several public health workers had told him that the "diagnosis of ova in the stools was quite difficult, contrary to general belief, because ascaris ova resembled vegetable fibres more closely than did the ova of any other parasite." [General belief is right; but the procedure might prove useful in recognizing infection by a male or males only.]

C. L.

TWINING (Cicely N.). **Infestation by *Ascaris lumbricoides*.**—*Kenya & East African Med. Jl.* 1930. Nov. Vol. 7. No. 8. pp. 233-234.

A Mkidi child of about 8, having vomited 6 round worms, was brought to hospital and given anthelmintics in these doses and at these intervals: santonin grains iij with calomel gr. iij, 2 days; oil of chenopodium min. vj, 2 days, 8 days, 2 days, 2 days or 5 doses of the oil in all. She passed 475 adult ascarids, thus far surpassing the previous record which was believed to be 300 in Ceylon; but unfortunately failing to establish one of 500, probably only because her mother removed her from hospital. The greatest number passed in one day was 120 after the third dose of chenopodium.

C. L.

READ (Hector). Untersuchungen ueber Askaris-Toxine. [**Ascaris Toxin Researches.**]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1931. Apr. Vol. 35. No. 4. pp. 227-237. With 5 text figs. [3 refs.] [Inst. for Ship & Trop. Diseases, Hamburg.]

Ascaris extract administered by mouth to, or injected subcutaneously into, 8 guineapigs produced pneumonic foci with hyperaemia and bleeding, no change in parenchymatous organs or endocrine glands, in some animals a strong eosinophilia, in others appearance of hyaline cells in lung and spleen.

C. L.

LUBIENIECKI (H.). Zur Frage der Therapie der Oxyuriasis. [**Treatment of Oxyuriasis.**]—*Wien. Klin. Woch.* 1931. Feb. 27. Mar. 13 & 20. Vol. 44. Nos. 9, 11 & 12. pp. 287-290; 355-359; 384-390. [39 refs.]

Lubieniecki's conclusions are unusual. He holds that there are individual differences in patients so strong that in many but not in all oxyuris multiplies without leaving the gut. For the same reason no one line of treatment suffices. Main stress is laid on prevention of reinfection by mouth and strong purgation kept up for 3 weeks. Drugs may be added, but the local use of suppositories and ointments is held useless, while the solution of the question of a suitable anthelmintic is bound up with those used against other intestinal worms.

C. L.

KENYA AND EAST AFRICAN MEDICAL JOURNAL. 1931. Jan. Vol. 7. No. 10. p. 309. **Treatment of Threadworms.** [J. H. S.]

Bismuth carbonate gave good results in a stubborn case.

C. L.

RODHAIN (J.). Un cas d'infection à trichostrongylus chez un Européen au Congo Belge. [**Case of Trichostrongylus Infection in a European in Belgian Congo.**]—*Ann. Soc. Belge de Méd. Trop.* 1930. Dec. 31. Vol. 10. No. 4. pp. 449-453. With 1 text fig. [7 refs.] [School of Trop. Med., Brussels.]

A woman who had twice lived in the Belgian Congo complained of anal itching and showed eggs identified as those of trichostrongylus, by the study of Byam and Archibald's book [though the table quoted should not have the authority of "Bailey" but of "Clayton"]. The egg illustrated has the typical appearance with morula and shell more sharply rounded at one end. An interesting point is made which the abstracter had mentally debated. In Ringer's solution these eggs measured 88μ to 93μ by 44μ to 56μ , but after floatation in a heavy salt solution 68μ to 84μ by 36μ to 48μ . The shrinkage is considerable.

C. L.

FAUST (Ernest Carroll). **The Panama Strains of Human Strongyloides.**—*Proc. Soc. Experim. Biol. & Med.* 1930. Dec. Vol. 28. No. 3. pp. 253-255. [7 refs.] [Dept. of Trop. Med., Tulane Univ., New Orleans.]

From 27 heavy strongyloides infections, believed free from hook-worm infection, active larvae were concentrated by the centrifuge, cultured, and the culture examined daily for 3 to 9 weeks.

"The results of this study indicate that 2 of the infections were purely of the indirect type, 13 were direct only, 7 were of a direct type in which dwarf filariform larvae were present in the freshly passed feces, and five were combination of these types. The term *hyperinfective strain* is proposed

for the type in which dwarf (unfed) filariform larvae are passed in the feces, since there is considerable evidence that this is the strain which is responsible for hyperinfection of the host."

C. L.

FAUST (Ernest Carroll). **In Vitro Effects of Certain Drugs on Strongyloides.**—*Proc. Soc. Experim. Biol. & Med.* 1931. Mar. Vol. 28. No. 6. pp. 691-693. [2 refs.]

The author concludes:—

"These *in vitro* tests with the free-living stages of *Strongyloides fulleborni* indicate that crystal violet in 0.1 per cent. dilution is more lethal than acriviolet or acriflavine in the same dilution, while mercurochrome is essentially ineffectual. On the other hand hexyl resorcinol in 0.1 and 0.01 dilutions showed a much greater strongyloidicidal capacity than any of the other reagents, and in 0.001 dilution was practically as potent as crystal violet in 0.1 dilution."

Faust suggests the need of testing hexyl resorcinol especially on the parasitic stage in infected hosts.

C. L.

ZSCHUCKE (Johannes). Therapeutische Versuche mit einer Simultanbehandlung mittels Tetrachlorkohlenstoff und Ascaridol. [**Simultaneous Treatment by Carbon Tetrachloride and Ascaridole.**]—*Arch. f. Schiffs- u. Trop.- Hyg.* 1931. Mar. Vol. 35. No. 3. pp. 138-145. [29 refs.]

This is an expansion of work already reported (*ante*, p. 180), but unfortunately it is not stated that certain important details were the same in both cases. The ascaridole was given either in gelatin capsules or in castor oil and the carbon tetrachloride either in capsules or a 10 per cent. by weight emulsion. Treatment in all was given to 250 persons in these various ways; but for those here reported on [the total number seems nowhere stated for multiple infections were doubtless present] the carbon tetrachloride seems to have always been given in emulsion in doses of 30 cc. to 50 cc. for a man of 60 kilos or 1.9 cc. to 3.1 cc. (3 to 5 gm.) of carbon tetrachloride on an empty stomach, salts one or two hours later, and an hour later food whether the bowels had opened or not. In all treated, infection was established by seeing the eggs. There was egg counting, presumably again by Stoll's method, before and at an unstated interval after treatment and there were evidently further treatments presumably till no more worms came away.

Hookworms: 32 persons treated: 1,522 worms recovered, 1,510 or 99.2 per cent. after the first treatment; 77 per cent. within 24 hours, 20 per cent. from 24 to 48 hours and 3 per cent. later. Of the 34 [sic] treated 33 were made worm-free, the other was rid of 86 per cent. of his worms judging by worm counts, by which criterion too egg production was exactly proportionately lessened so that the drug did not interfere with egg production. [This conclusion apparently implies that second counts took place within a few days of treatment; and will be accepted by those who agree that examination of 1-100 gm. (or 1-200 gm. in Stoll's modified method) of faeces can measure the egg content accurately when 1 gm. of faeces contains only 21 eggs, as was held to be the case here.]

Ascaris: 9 persons treated, 59 worms recovered, 56 or 95 per cent.

by the first treatment; 16 per cent. within 24 hours, 57 per cent. from 24 to 48 hours and 27 per cent. after 48 hours. 7 of the cases were disinfested and 90 per cent. of the worms [total unstated] removed from the other three.

Trichuris: 10 infected persons treated, 7 worms recovered in all, 6 after the first treatment.

The work was done in a sleeping sickness camp in Fernando Po.

C. L.

BOYÉ (R. P.). Essais de déparasitage méthodique des porteurs de nématodes intestinaux. [**Attempts to deparasitize Intestinal Nematode Carriers.**—*Bull. Soc. Path. Exot.* 1931. Jan. 14. Vol. 24. No. 1. pp. 41-45.]

Boyé has tested pulverized, and at least partly particulated, thymol given in capsules, each capsule containing

Powdered thymol	0.25 gm.
Phenolphthaleine	0.02 „
Talc	0.10 „

Liquid diet was given for 3 days; and on the first of these 0.4 gm. of calomel, on the second 20 capsules [thymol 5 gm. or 75 grs.], on the third the diet only. Of the 43 treated, 29 or two-thirds were disinfested, as far as the tests determined, apparently in two treatments and 20 in one. In detail: 20 of 23 hookworm cases were cured [? two treatments] or 87 per cent., 15 of 27 trichuris cases or 56 per cent., and all of 4 ascaris cases. Diagnosis was by one, two, or rarely three, smears of unnoted size examined with a mechanical stage and it is noted that the cures must really be somewhat below this figure.

C. L.

NAITO (K.). Die Massenabtreibung der Parasiten des menschlichen Körpers. [**Mass Treatment for Parasites of Man.**—*Jl. Public Health Assoc. Japan.* 1930. Dec. Vol. 6. No. 12. pp. 1-2.]

Since 1924 the treated have numbered 4,548,519, and for the last four years over a million annually. The method is really mass treatment not herd treatment, being applied only to those whom faecal examination by smear, sedimenting, or floating has shown to be infected. The treatment for ascaris has been "Herba digenae" 5 to 15 gm. daily, or santonin 0.05 to 0.08 gm., for hookworms thymol 2 gm., oil of chenopodium 1 gm. or carbon tetrachloride 2 to 3 gm. Results, comparative or total, are not given. The widespread manuring of fields with human faeces is noted and references given to advised lay-outs for privies, which have already appeared in the Journal.

C. L.

AFRICA (Candido) & LUCKER (John T.). **Treatment of Experimental Trichinosis in Rabbits with Neutroflavine.**—*Proc. Soc. Experim. Biol. & Med.* 1931. Jan. Vol. 28. No. 4. pp. 432-434.

Having ascertained that normal rabbits tolerated daily intravenous injections of 1.5 cc. of 1 per cent. neutroflavine in water, three rabbits were fed with about 8,000 decapsulated larvae of *Trichinella spiralis* each,

NUMBER OF TRICHINAE FOUND IN SERIES 1.

—	Tongue	Masseter	Diaphragm	Inter-costals	Thigh	Total
Rabbit 1 (7 intravenous and 5 intramuscular injections)	5	9	5	0	1	20
Rabbit 2 (12 intravenous injections)	0	0	0	0	0	0
Rabbit 3 (Untreated)	69	51	34	5	5	164

obtained by pepsin digestion of the muscles of a trichinous rabbit. The results of such treatment are shown in the accompanying table, fourteen microscopic preparations being examined in each case from each muscle.

C. L.

- VAN CREVELD (S.). Een bijzondere vorm van ascariasis.—*Nederl. Tijdschr. v. Geneesk.* 1931. Feb. 21. 75th Year. 1st Half. No. 8. pp. 890-902. With 2 figs. on 1 plate. [Refs. in footnotes.]
- DAS (K. K.). A Note on Blood Changes in Filariasis.—*Indian Jl. Med. Res.* 1931. Jan. Vol. 18. No. 3. pp. 813-816. [1 ref.]
- EICHHORN (M.). Bilharziosis der urinerwegen.—*Geneesk. Tijdschr. v. Nederl.-Indië.* 1931. Apr. 1. Vol. 71. No. 4. pp. 373-375. With 1 plate.
- JONES (W. J.) & BUNTING (C. H.). Invasion of the Fallopian Tube by *Oxyuris vermicularis*. Report of a Case.—*Arch. Pathology.* 1931. Feb. Vol. 11. No. 2. pp. 229-235. With 2 text figs. [16 refs.]
- KOBAYASHI (Hidekazu). Studies on the Structure of the Reproductive Organs of the Trematoda. (Report I.) On the Male Genital Organs of *Fasciolopsis buski* and *Fasciola hepatica*.—*Taiwan Igakkai Zasshi (Jl. Med. Assoc. Formosa).* 1930. Nov. No. 308. [In Japanese. With 1 plate & 2 text figs. English summary pp. 66-71.] [Govt. Med. College, Taihoku, Formosa.]
- MITRA (Subodh). Filarial Affection and its Treatment with Deep Röntgen Therapy.—*Brit. Jl. Radiology.* 1930. Nov. Vol. 3. No. 35. pp. 521-523.
- MOHAMMED (Abdel Shafi). The Secretary Glands of the Cercaria of *S. haematobium*.—*Ann. Trop. Med. & Parasit.* 1931. Mar. 31. Vol. 25. No. 1. pp. 99-105. With 4 figs. [12 refs.] [School of Trop. Med., Liverpool.]
- O'CONNOR (F. W.), GOLDEN (Ross) & AUCHINCLOSS (Hugh). The Röntgen Demonstration of Calcified *Filaria bancrofti* in Human Tissue.—*U.S. Nav. Med. Bull.* 1931. Jan. Vol. 29. No. 1. pp. 17-25. [11 refs.]
- PRAWIROHARDJO (R. Sarwono). De mijnworminfectiedichtheid in kampong Tjiasem Kaler (Regentschap Pandegland).—*Geneesk. Tijdschr. v. Nederl. Indië.* 1930. Dec. 1. Vol. 70. No. 12. pp. 1219-1227. With 2 text figs.
- RENAUD. Syndrome pseudo-tétanique observé chez un enfant atteint d'ascariodiose.—*Bull. Soc. Path. Exot.* 1929. Oct. 9. Vol. 22. No. 8. pp. 747-748.
- WALLS (E. S.). Ovipositing in *Strongyloides stercoralis*. [Correspondence].—*West African Med. Jl.* Lagos. 1931. Jan. Vol. 4. No. 3. p. 73.

ERRATUM.

Vol. 27, p. 963, CAWSTON summary, line 2. Between "and" and "in man," insert "has been reported."

REVIEWS AND NOTICES.

KUDO (Richard Roksabro) [D.Sc., Assistant Professor of Zoology, University of Illinois]. **Handbook of Protozoology.**—pp. x+451. With 175 figs. 1931. London: Baillière, Tindall & Cox, 7-8, Henrietta Street, Covent Garden, W.C.2. [25s.] [Review appears also in *Bulletin of Hygiene*.]

The aim of the author has been to provide a handbook wherein the student would find introductory information on the common and representative genera of all the groups of both free-living and parasitic protozoa. As is but natural, the organisms which are found in the bodies of host animals occupying various rôles as saprophytes, commensals or true parasites, have received considerably more attention than the free-living forms from which unquestionably they have evolved. Several excellent textbooks and monographs are available which cater more or less comprehensively for the student of the purely parasitic forms; Kudo, however, has taken rather a wider view and has shown the manner in which the ecto- and endo-parasitic protozoa are related to the other genera comprising the phylum. The fact is stressed that the information concerning any given species is of an introductory character and far from an exhaustive survey, but is intended, in association with the bibliographical references at the end of each chapter, to serve as a guide or indication of the lines on which further knowledge may be acquired.

The first three chapters deal with general considerations such as the historical aspect, the morphology, physiology and various methods of reproduction. Chapter IV, of 21 pages, gives an outline of the classification based on that formulated by BÜTSCHLI and modified by other workers in this field. From Chapter V onwards, including the larger part of the book, the different classes, orders, families and genera are considered seriatim and, in the case of certain genera which are of common occurrence, e.g., *Amoeba*, *Entamoeba*, *Euglena*, several species are mentioned. There are a large number of illustrations which are grouped together in 175 figures; these are clear and accurately drawn, but have been reproduced at too low a magnification so that to discern the detail a reading glass may be necessary. In this section there occur some minor discrepancies which, in a book of an encyclopaedic character, assume an undue importance. The book concludes with an all too brief appendix on the collection, cultivation and observation of protozoa.

To the average medical practitioner, who is concerned mainly with the pathogenous forms, this handbook can have little appeal, but in the case of the medical or veterinary protozoologist or those who are field workers in pure and applied biological sciences it should prove extremely useful.

J. G. Thomson.

NAPIER (L. Everard) [STILLING (E.) transl.]. **Leishmania.**—*Handbuch der pathogenen Mikroorganismen.* [Kolle u. Wassermann.] 1930. Band 7. Lfg. 47. pp. 1497-1560. With 7 figs., 2 charts & 1 coloured plate. [12 pages of refs.]

The author has presented his readers with an excellent general account of the various infections and diseases caused by parasites of the genus *Leishmania*. It is based on his own extensive experience and on the published work up to the end of 1928 or beginning of 1929, when presumably the article was finally sent to press. As few changes have occurred since then, it can be accepted as the most up to date and accurate treatise on the subject.

C. M. Wenyon.

FRÓES (Heitor Prager). **Do "Mycetoma pedis" no Brasil.** [Mycetoma pedis in Brazil.]—Trabalho do Laboratorio de Histologia da Faculdade de Medicina da Bahia e do Laboratorio de Analyses Medicas do Autor. [Thesis.]—pp. iv+300. With 95 figs. on 48 plates. 1930. Bahia: A Nova Graphica.

This careful and detailed record will take a high place among works dealing with pathogenic fungi. Mycetoma pedis—a better name than Madura foot—is not so common in the West as in the East, but the present monograph is based on a study of 57 cases dating from Pacheco MENDES' patient observed in 1894. 23 of these occurred in S. Paulo, 17 in Bahia, 5 in Rio de Janeiro; the remaining 12 were divided among 7 States. The scheme of research planned by the author was as follows: 1. A questionnaire to the principal hospitals, dermatologists, surgeons, pathologists, etc., in Brazil asking for details of any patients suffering from this disease under their care in the past or present. 2. Examination of the records and case-sheets of the chief hospitals for published or unpublished cases. 3. Examination of sections of tissues taken from such patients, from museums or pathological cabinets of hospitals. The returns were surprisingly meagre. It is true that records of 12 patients were obtained from the Santa Isabel Hospital between 1870 and 1930, and five from a hospital in S. Paulo, but a search among the records of 38,764 patients at the Military Hospital did not produce a single case.

The present work, after this preliminary statement of the plan of study proposed, opens with a short chapter on the synonymy and history of Mycetoma pedis in Brazil; this is succeeded by a tabular presentation of the main discoverable points of each of the cases traced. Discussion of aetiology shows the frequency of trauma as the accredited starting point, often the prick of a mimosa thorn or a splinter of wood, occasionally the bite of an insect or a snake. Two-fifths of the patients were between 10 and 20 years of age and half were between 20 and 40 years. With so small a total of cases it is not possible to estimate the influence of sex or race. The fungi responsible for the Brazilian disease are *Nocardia bovis*, *N. madurae*, *N. brasiliensis*, and a closely allied species, *N. bahiensis*, and another species allied to *N. somaliensis*.

On anatomical and clinical grounds three forms of the condition are described, the suppurating, the cystic, and the sclerosing, but the author proposes a division into Phaneromycetomas, with sinuses discharging granules, and Cryptomycetomas without elimination of granules. Diagnosis rests on the clinical condition, on pathological and microscopical findings, aided, when possible, by cultivation of the fungus. On this part there is little calling for comment, but a useful key to the identification of those species causing the disease in Brazil is presented. Animal inoculation did not prove of much service.

Differential diagnosis from a number of conditions is considered. Prognosis *quoad vitam* is favourable, *quoad functionem* unfavourable; treatment is almost exclusively surgical, though if seen in the early stage (which is very rare) the patients are benefited by iodide. Prophylaxis may be summed up in three words, "Never go barefoot" (Não andar descalço).

In a second part of the monograph the author details minutely three cases under the care of others, dealing with the pathological histology, and experiments in animal inoculation and fungus culture. This section is followed by one with brief accounts of six unpublished cases and one of pseudomycetoma or angiokeratoma—a tumour-like hyperplasia of the cuticular and subcuticular structures with increase of blood vessels, but with absence of fungus growth.

The work is illustrated with an abundance of photographs and microphotographs. Some of the former depicting the macroscopical conditions are excellent; the latter are less successful. All pathologists who have studied the morbid histology of fungoid and granulomatous lesions know

the difficulty, one might say the impossibility, of adequately reproducing the details of structure by microphotographs and it would have served the purpose better if a few coloured plates of stained sections had replaced the large number of barely decipherable photographs. With this reservation, the work and the form of its production are worthy of high praise.

H. H. S.

DE ARAUJO (Eduardo Lins Ferreira) [Assistente e Chefe de Laboratorio da Cadeira de Microbiologia—Docente Livre de Microbiologia]. **Do Mycetoma Pedis no Brazil.** [Mycetoma pedis in Brazil.] These sorteada para concurso de Professor Cathedratico da Cadeira de Medicina Tropical.—pp. xviii+331. With 28 plates (4 coloured). 1930. Bahia: Oficinas da Livraria "Duas Americas," Praça da Inglaterra.

This professorial thesis is the second large and comprehensive work to be published recently on the subject (see above). The present differs, however, from the former in being a general review and compilation of all the published accounts of any note available. It consists of 15 chapters or sections. The first is a chronological study (71 pages) summarizing general opinions from the first reference to the disease by R. de G. DAUNT in "Medical Letters from Brazil," published in the *Dublin Medical Press*, 1861, under the title "Endemic Disease of the Foot in Brazil," down to 1930. Next follow sections on the Aetiology and Pathogeny, with epidemiological data, and a short clinical study. Clinical classification is on the same lines as those of FRÖES into tumour formation with granules (mycetomas), tumours without granules (paramycetomas), fistulous forms with granules, and encysted forms. The author presents in schematic tables the various aetiological classifications which have been proposed from time to time, by LANGERON, BRUMPT, CHALMERS and ARCHIBALD, CHALMERS and CASTELLANI, and GAMMEL, with a tabular synopsis and distribution in Brazil according to State. A botanical classification is given later in the book. More detailed study ensues on diagnosis, the grains, culture of the fungi and the anatomical and histological changes set up. Before dealing with prognosis and treatment, he returns again to speak of the three main subdivisions of mycotic-like conditions: Paramycetomas (v. s.), Pseudomycetomas distinguished (by CHALMERS and ARCHIBALD) from the last in absence of eosinophile bodies in the tissues, and Neomycetomas or epithelial new-growths of malignant type and of mycotic aspect but showing neither eosinophile bodies nor mycelial filaments. The work ends with a fairly full bibliography of over 300 titles. The whole is well reproduced and clearly printed with good photographs, microphotographs and coloured plates showing the pathological histology. It forms an excellent companion volume to that of Dr. FRÖES, the former giving a thoughtful survey of the whole subject, the latter dealing more with detailed personal research.

H. H. S.

SOERIOBROTO (Mas Antariksa). **Schommelingen in het aantal leucocyten, tevens een studie over tropenlymphocytose.** [Fluctuations in the Number of Leucocytes together with a Study of Tropical Lymphocytosis.] [Thesis for Doctorate in Medicine, Univ., Leiden.]—pp. xii+132. 1930. Leiden: N. V. Boek- en Steendrukkerij Eduard Ijdo.*

This thesis deals largely with the value of the total and differential leucocyte blood counts and the investigations were carried out on 26

* A version has also appeared in *Acta Leidensia (Scholae Med. Tropicae)*. 1930. Vol. 5. pp. 1-82.

individuals, of whom 10 were examined in Rotterdam and 16 in Batavia. It is a thesis which is largely destructive of faith in the counts, more particularly in their relation to supposed physiological alterations of the blood picture; but it includes also a qualified condemnation of pathological findings. Observers have not hitherto taken into account the great oscillation in absolute and relative numbers among leucocytes which is taking place constantly, one might almost say every minute, and which may in certain cases attain 100 per cent. A work which made this clear was that of DOAN and ZERFAS on rhythmic variations of the white blood cells. The time interval used by these authors was one of examination every 15 minutes, while those of the present author, who confirms the findings, were as short as 7 to 10 minutes. The conclusions give a good idea of the extent of the study made and may be summarized as follows:—

Fluctuations in the number of leucocytes in the circulating blood are occurring at every instant and are independent of the intake of food, of posture, of increased heart action and of exercise. The discovery of this fluctuation, which, moreover, is highly individualistic, largely discounts the generally accepted data regarding blood cell composition under varying physiological and pathological conditions. It is probably a fluctuation resulting from divergent influences of the autonomic nervous system. Such a state as tropical lymphocytosis does not exist.

The deductions certainly are of rather a sweeping nature seeing that they are based on 26 individuals only. Our author, however, recognizes that a large amount of work on the subject is yet required.

W. F. Harvey.

BONNE (Willem Meindert). De croupouse pneumonie in Nederlandsch-Indië. [Croupous Pneumonia in Dutch Indies.] [Thesis for Doctorate in Medicine at the Medical High School, Batavia.]—115 pp. Batavia: C. Druk van G. Kolff & Co.

The author's interpretation of the term "croupous pneumonia," as observed by him in Java, differs greatly from that current among English-speaking nations. A condition in which red hepatization is rare, in which the sputum is not viscid and is seldom "rusty," where the pneumonia is of a "subacute" or "bronchopneumonic" type, and the temperature falls by lysis in nearly half the cases (46.38 per cent.) clearly cannot be compared with croupous or lobar pneumonia—pneumococcal infection of the lungs—as seen in Britain.

His findings show that pneumococcal infection accompanied by sub-acute pulmonary reaction is associated with *Str. pneumoniae* type I; and that when meningeal symptoms are present, with jaundice and tissue haemorrhages, type III is most common.

W. F. Harvey.

LANGERON (M.) [Chef de Laboratoire à la Faculté de Médecine de Paris] & **DU NOYER (M. Rondeau)** [Assistant à la Faculté de Pharmacie de Paris]. **Coprologie Microscopique.** [Microscopical Coprology.] 2nd Edition.—180 pp. With 201 figs. & 3 plates. 1930. Paris: Masson et Cie. Editeurs, 120 Boulevard Saint-Germain. [24 fr.]

The second edition of this small monograph describes solutions used in faecal examinations, methods of collection, of preparation, of microscopic

examination, and of egg counting. Flootation methods for concentration of nematode eggs are evidently deliberately rejected since they find mention only in the bibliography. Illustrations of the microscopic bodies found normally or abnormally in faeces are most lavish, for some of the numbered figures contain a score or more of different objects, mineral, vegetable and animal. Though the published source from which the illustrations are taken is not always acknowledged when it is not original, these figures are likely to prove of considerable value to those who are puzzled as to the identity of curious objects they find in faeces. Unfortunately an exception must be made in the case of adult hookworms. The figures given will not greatly help the student either in a recognition of the worms or in an appreciation of the structures on which their differentiation must be based.

Clayton Lane.

VENEZUELA. Conferencia Sanitaria Nacional de 1930. [National Health Conference, 1930.]-Estados Unidos de Venezuela.-Ministerio de Salubridad y de Agricultura y Cria.-544 pp. With 1 folding map & 1 folding plate. 1931. Caracas: Tipografía Americana.

This volume comprises the reports from 13 of the 20 United States of Venezuela as regards the prevalence of hookworm infection. The results given in detail of the individual States are mainly of local interest but the following general information of Venezuela as a whole may be of value. Altogether returns were made from 273 districts; a total of 20,387 persons were examined and 10,550 or 52 per cent. were found positive. For statistical purposes the index of prevalence is given under the three heads of sex, race and age, and these are again presented under 4 groups: mixed population, school children, hospital patients (in 4 States only), and inmates of barracks and prisons (in 5 States).

Of the mixed population, 11,088 were examined and 6,596 (59 per cent.) were positive. The percentage infected varied greatly in the different States, being as low as 12 in Nueva Esparta, as high as 91 in Zamora. Of 8,277 school children examined 3,163 (38 per cent.) were positive, and again the prevalence varied within wide limits, 17 per cent. in Mérida, 82 in Táchira. The number of hospital patients examined was only 164, and 92 were positive; in the barracks and prisons 699 out of 858 (82 per cent.). As regards sex, the numbers examined were nearly equal, 9,629 female, 10,758 male; 48 per cent. of the former and 55 per cent. of the latter proved positive. For obtaining statistics of race infection, the population examined was divided into whites (6,619), half-castes (12,386), negroes (1,225), and Indians (157). The percentages of infection were respectively 49, 52, 60 and 56, but it will be noted that the relative proportions of the constituent races were 32.47 white, 60.75 half-castes, 6.01 negro, and 0.77 Indian.

Lastly, the question of age; below 5 years 1,221 were examined and of these 573 (47 per cent.) were positive; between 5 and 10 years 4,960 examined, 2,110 (43 per cent.) positive; 10 to 20 years 8,431 examined, 4,197 (50 per cent.) positive; 20 to 50 years 4,944 with 3,227 (65 per cent.) positive, and a little more than half (53 per cent.) of 831 above 50 years were positive. Of the total of 10,550 infected, the percentages were: under 5 years 5.43, 5-10 years 20.0, 10-20 years 39.78, 20-50 years 30.59, over 50 years 4.2.

It will be seen from the returns that ankylostomiasis is widespread in Venezuela, and that though the proportion infected varies much in different districts, the actual distribution is nearly the same in both sexes, in all races and at all ages.

H. H. S.

KHALIL (Mohamed) [M.D. (Egypt), Ph.D. (London), M.D. (Brux.), M.R.C.P. (London), Professor of Parasitology, Faculty of Medicine, Cairo]. **The Bibliography of Schistosomiasis (Bilharziasis) Zoological, Clinical and Prophylactic.**—The Egyptian University. The Faculty of Medicine. Publication No. 1. pp. x+506. With 1 plate. 1931. Cairo. Egyptian University. [30 P.T.; 6s.]

Dr. Khalil having collected, up to the end of 1930, 2,649 references to papers on schistosomiasis, felt that the time had come to make these accessible in print. He does not claim completeness for his Bibliography, but invites interested workers to collaborate by sending him notes of corrections or additions for a revised edition which he hopes to issue in a short time. Dr. Khalil has drawn on the resources of the Faculty of Medicine, Cairo, where he had access to the late Professor Looss's helminthological library, and on those of the Institut für Schiffs- und Tropenkrankheiten, at Hamburg. He has also made free use, with full acknowledgments, of such recognized tools of medical bibliography as the *Index Medicus*, the *Surgeon-General's Catalogue*, etc. In relying in two instances on these tools he has, however, been ill-served, in that they have misled him into including two papers by EISENBARTH and NOTTER on schistosome monsters.

The Bibliography is arranged first by Authors (pp. 1-232) and then by Subjects (pp. 233-503), the Subject section being classified under, and sub-divided within, the five main headings—1. General; 2. Historical and Reviews of Literature; 3. Zoological; 4. Schistosomiasis (Clinical); and 5. Prevention. Comparison with Professor LEIPER's "Bibliography of Bilharziasis" published in 1915 shows the rapid growth of literature on bilharziasis, for Professor Khalil gives more than four times the number of references listed by Professor LEIPER. The increase in output of authors is also striking. The late Professor Looss, for instance, with the classification of the Distoma and the working out of the life history of *S. haematobium* to his credit, provided only 23 entries in as many years, while in rather less than half that time a modern writer has run up a score of over 100 title entries against his name. Professor Khalil has done good service therefore by bringing all the recent references together, and though his Bibliography may not be a monument of exactitude, it is likely to have a very considerable value for other workers in the same field.

R. L. S.

LEWIS'S MEDICAL & SCIENTIFIC CIRCULATING LIBRARY. Supplement to Catalogue, 1928-1930.—112 pp. 1931. London: H. K. Lewis & Co., Ltd., Gower Street, W.C.1. [2s. net (To subscribers 1s. net).]

This printed Supplement to the main Catalogue of Lewis's Library contains entries for some 3,000 medical and scientific books in English added to the Library in the period 1928-1930. The general arrangement of the main Catalogue has been followed, an authors' list with titles (90 pp.) preceding an index of subjects (22 pp.). For books in English published outside Great Britain the place of publication is given, and as might be expected American books provide the bulk of such entries.

R. L. S.

BUREAU OF HYGIENE AND ~~TROPICAL~~ DISEASES.

TROPICAL DISEASES BULLETIN.

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[No. 9.

UNDULANT FEVERS.

ASHFORD (M.) & QUINNELL (Earle). **Undulant Fever in Territory of Hawaii.**—*Milit. Surgeon*. 1930. Nov. Vol. 67. No. 5. pp. 617-620.

So far no cases of undulant fever have been reported in Hawaii although the dairy herds there are known to be infected with *Br. abortus*. The authors tested the sera of some 600 people, many of whom were employed in dairies, but none gave a positive reaction with *Br. abortus*.

A case of infection is reported, in a lady, aged 30, the wife of an officer who had lived for about a year in Oahu, Hawaii; for a month or two before the birth of her child and during lactation she drank large quantities of unboiled cow's milk; in December 1929 fleeting joint pains were complained of and fever developed in January. Several recurrences of fever took place up till May when the patient became convalescent. On April 17 a serum test was made with *Br. abortus* and in 24 hours agglutination was shown in all dilutions up to 1-2,500. Blood cultures were not successful and no other source of infection than the raw cow's milk could be traced.

D. Harvey.

MASSELOT (F.). Notes sur quatre vingts cas de fièvre de Malte observés à l'Hôpital Français. [**Notes on 80 Cases of Undulant Fever observed in the French Hospital in Tunis.**—*Tunisie Méd.* 1930. Nov. Vol. 24. No. 9. pp. 321-329.

These 80 cases were in Europeans admitted to the Hospital during the ten years from 1920-1930. In 24 cases the temperature curve was of the typical or undulant type, in 43 it was remittent or intermittent and in 11 it resembled closely the chart of typhoid fever. In the majority the duration was prolonged, "maladie interminable." In one case the picture was that of rheumatic fever with acute pain, swelling and redness of the joints, but there was a positive Widal agglutination reaction of over 1-200 with *Br. melitensis*. Three

patients had definite signs of septicaemia; all showed a purpuric eruption and in one there was haemorrhage from the bowel and haematuria. The author is of opinion that an attack of undulant fever has no influence on tuberculosis; as he puts it, *melitensis* is neither the friend nor the enemy of the bacillus of Koch; it is neutral. For differentiation between undulant fever and tubercle he relies principally upon a careful and accurate X-ray examination of the chest and on sero-diagnosis; the latter should not be accepted as diagnostic of undulant fever unless the reaction is positive in 1-200 or higher dilution. The intradermal reaction of Burnet he has not found so useful since it may be positive in definite cases of tubercle.

As regards treatment neither protein therapy nor injection of anti-septics, such as urotropine or trypaflavine, have been of any avail. Vaccine therapy by intracutaneous or intramuscular route has been of no use in his hands; in 3 cases the intravenous injection of vaccine was a brilliant success but in many other cases it failed and the author has abandoned this method of therapy by reason of the severe reactions and the impossibility of forecasting when they will appear. In two cases treated by vaccine, in one the fever ceased but severe pains in joints appeared, in the other the pains disappeared but fever continued. The therapeutic injection of melitene was also in his hands a failure.

D. H.

HUDDLESON (I. Forest). Etude sur les infections à *Brucella* observées à Tunis et à Malte. [**Brucella Infections observed in Tunis and Malta.**]—*Arch. Inst Pasteur de Tunis*. 1930. Dec. Vol. 19. No. 4. pp. 391-421. With 3 figs. [8 refs.] [Summary appears also in *Bulletin of Hygiene*.]

Much of the material in this article has already been published elsewhere; a number of observations, however, made by the author during his visit to Malta and Tunis, are put on record for the first time. A comparison was made between the value for blood culture of the usual veal infusion broth pH 7.2 and liver extract broth pH 6.6. Using veal broth, 4 out of 15 cultures proved positive, while with liver broth 14 out of 17 cultures, from the blood of the same series of patients, proved positive. Evidence was obtained that cultures were more frequently positive during a febrile attack than during an apyrexial interval. Stress is laid on the necessity of prolonged incubation of blood cultures; in two instances growth did not occur for 12 and 15 days respectively. As regards the serological diagnosis of undulant fever, it is stated that *Br. abortus* is now being used as an antigen in several Mediterranean laboratories in place of *Br. melitensis*. Cultures of *melitensis* frequently become rough; in this stage, besides being agglutinated only slightly by specific sera, they prove relatively susceptible to agglutination by normal sera. It is partly, perhaps, due to the use in the past of more or less rough cultures of *melitensis* that the agglutinin titres in cases of undulant fever have so often been low; the author finds that, when tested with an *abortus* antigen, sera from cases of *melitensis* infection react in comparatively high dilutions.

Burnet's intradermal test in diagnosis was apparently not found very reliable, some definite cases failing to react.

Comparison of undulant fever in the Mediterranean countries, due to *Br. melitensis*, with undulant fever in the U.S.A., due to the bovine and porcine types of *Br. abortus*, shows that the former disease lasts longer, is more frequently acute, has a higher case mortality, and is more often complicated by severe arthritis or orchitis.

G. S. Wilson.

MEDULLA (Candido). Sulla frequenza della febbre melitense in Cirenaica. [**Undulant Fever in Cyrenaica.**—*Arch. Ital. Sci. Med. Colon.* 1931. Mar. 1. Vol. 12. No. 3. pp. 187–191. English summary (7 lines).

Undulant fever, though far from common, does undoubtedly occur. Thirty-six cases have been noted in the last 8 years; in 1925–26 there were none, and the highest number in any single year was 18 in 1929. Six of these were European civilians (3 men, 3 women), 12 were white soldiers. All were in the Colonial Hospital, Benghazi, and, judging from the small number of patients, the chief district infected is Benghazi-Barce-Tolmetta. In the following year there were seven cases, again all Europeans and in the same district. The local goats are believed to be infected. Enquiries as to the *abortus* infection brought the replies that epidemic abortion is not known in the flocks or herds.

H. H. S.

LEVIN (William). **The Intradermal Test as an Aid in the Diagnosis of Undulant Fever.**—*Jl. Lab. & Clin. Med.* 1930. Dec. Vol. 16. No. 3. pp. 275–281. [16 refs.] [Hyg. Lab., State Board of Health, & Med. School, Univ. of Oregon, Portland.]

A heat-killed saline suspension of *Br. abortus* was first employed in the author's tests. In persons recently recovered from undulant fever this antigen gave unpleasantly severe results, and an attempt was made to produce one less toxic.

Br. abortus was grown on liver agar, washed off in saline and spun down, the supernatant fluid was decanted and the bacterial bodies again washed three times in 50 per cent, 95 per cent. and absolute alcohol. The washed bacterial cells were then extracted with absolute alcohol in a Soxhlet apparatus for two days, then with ether for two days. After the final extraction the bacterial cells were dried and thoroughly ground in an agate mortar, and finally suspended in saline.

A large number of tests were carried out on known and suspected cases of undulant fever and also on tuberculous subjects and normal people. In all 365 individuals were given the intradermal test. Twenty-seven gave distinctly positive reactions; of these fifteen were definite cases of undulant fever with positive agglutination tests; six were people who had had undulant fever two years previously. Four who reacted gave negative agglutination tests and no history of undulant fever or contact with *abortus* infection.

The author concludes that the intradermal test promises to be of distinct diagnostic aid to the clinician and merits serious consideration. It may be of use also in cases where agglutination is negative.

D. H.

BROC. Note sur les relations entre la fièvre méditerranéenne et la tuberculose. [**Relation between Undulant Fever and Tuberculosis.**]—*Tunisie Méd.* 1930. Apr. Vol. 24. No. 4. pp. 157-160.

The author has seen several cases of undulant fever with a positive agglutination of 1-10 to 1-100, in which there were signs and symptoms of early phthisis and subsequent development of that disease. He asks, were these true cases of undulant fever lighting up a tuberculous focus or did the tuberculous process simulate undulant fever? Cases have been also noted of tuberculous patients who gave a positive reaction to *Br. melitensis*, but no history of an attack of undulant fever. In all such cases blood culture and X-ray examinations should be employed as aids to diagnosis.

D. H.

BEVAN (LI. E. W.). **Blood Culture in Undulant Fever.** [Correspondence.]-*Brit. Med. J.* 1930. Aug. 16. p. 267.

Dr. Bevan refers to a letter of Dr. G. S. WILSON in which he states that CO₂ is absolutely essential for the initial growth of the bovine *abortus* type of Brucella. This has not been the experience of Bevan and his co-workers in Rhodesia where the local bovine strain is readily isolated in primary culture without regard to the CO₂ or oxygen content of the medium. Bevan suggests that the Southern Rhodesian strain of *Br. abortus* is peculiar to that country. [This point has already been noted by DUNCAN.]

D. H.

CONTERNO (V.). La tripaflavina nella cura della febbre di Malta. [**Trypaflavine in the Treatment of Undulant Fever.**]-*Giorn. d. R. Accad. Med. di Torino.* 1930. Apr.-June. Anno 93. No. 2. pp. 135-137.

Fourteen patients suffering from undulant fever were treated by the method described. They comprised both hospital and private patients; the diagnosis was confirmed either by blood culture or by agglutination of *Br. melitensis* in a titre of 1 in 800. Nearly all had previously been treated by vaccines, sera, autohaemotherapy or drugs. The author used a 2 per cent. solution of tripaflavine in doses of 10 cc. injected intravenously with two days' interval for 8-10 injections. After 2 or 3 injections the temperature began to fall, in some gradually, in others by crisis [this may have been a natural drop about the 7th day], but the complete course was persisted in. With the fall of temperature the symptoms, subjective and objective, improved, the joint-pains, neuralgias, sweats, enlargement of liver and spleen, together with increase in weight and restoration of the blood to normal. Of the 14 patients, 10 were followed up for several months, and 4 left the town. One of the ten interrupted the course "for fear of vomiting," but nevertheless was free from fever for 20 days. Six were cured straight away, three had a slight return of fever in 1 to 2 weeks, to 37.8°-38.3° C., but these were cured by another 3 or 4 injections. [The remedy clearly merits further trial. See also this *Bulletin*, Vol. 26, p. 446.]

H. H. S.

THURBER (D. S.). **The Results of the Use of Acriflavine Hydrochloride in the Treatment of Undulant Fever.**—*Canadian Med. Assoc. J.* 1930. Nov. Vol. 23. No. 5. pp. 665-668. [3 refs.]

Undulant fever due to *Br. abortus* is common in certain districts of Mexico. The author gives an account of 14 cases all diagnosed by positive agglutination tests, seven of which were treated with acriflavine and seven without. The dosage was 0.1 gm., 0.2 gm., and 0.3 gm. at intervals of 3 days. The tablet of acriflavine hydrochloride was crushed up in 20 cc. of warm saline and an intravenous injection of normal saline was given. When this was running well the 20 cc. of acriflavine solution was added to it and slowly injected. In five of the treated cases the fever was arrested within one month after starting the treatment. In the seven untreated cases the fever lasted from 9 months to two years and two of the cases ended fatally.

D. H.

RUDNEW (G. P.) & KRUMBERG (A. J.). Zur Behandlung des Maltafiebers. [**Treatment of Undulant Fever.**]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1931. Feb. Vol. 35. No. 2. pp. 81-89. With 2 charts in text. [1 ref.] [Therap. Clinic, North Caucasian State Univ., Rostov-on-Don.]

The authors had under observation 3 cases of undulant fever from the North Caucasus, diagnosed on the clinical picture and on a positive agglutination reaction. They discuss methods of treatment and point out that so far there is no specific method, the best results being obtained with vaccine and serum therapy. In the first two cases autohaemotherapy was tried but without any marked result. Injections of "Rivanol," "Osarsol" and carbolic acid were without benefit. Finally, they utilized X-ray therapy, the region of the spleen being irradiated for fifteen minutes with a fixed dose* on 5 or 6 occasions. The authors claim excellent results, the temperature falling to normal and the pains in the joints disappearing. They agree that the number of cases is too small for a definite pronouncement but recommend a more extended trial of the method.

D. H.

LE CHUITON & NÉGRIÉ. Deux cas de mélitococcie traités par les sels d'acridine. [**Two Cases of Undulant Fever treated by Acridine Salts.**]—*Bull. et Mém. Soc. Méd. Hôpit. de Paris.* 1930. Nov. 24. Year 46. 3rd Ser. No. 31. pp. 1633-1635. With 2 text figs.

The first case, which was diagnosed by isolation of *Br. melitensis* from the blood, was treated by injections of trypanflavine in 2 per cent. solution (doses 5-20 cc.). The second case, which was one of laboratory infection, blood culture positive, was treated by injections of gonacrine (0.5 per cent.) in the early stages with excellent results, the temperature falling to normal in the course of two weeks. The authors recommend a trial of these drugs in this disease and also in other bacillaemias.

D. H.

* Filter.	Tube.	Milliampere.	Duration.	Dose.
4 A1.	10+15	2	15 mins.	1-6.

DUBOIS (Charles) & SOLLIER (Noel). Premiers résultats de la vaccination préventive de l'homme contre la fièvre ondulante. [**First Results of Preventive Vaccination of Man against Undulant Fever.**]—*Ann. Inst. Pasteur.* 1930. Nov. Vol. 45. No. 5. pp. 596-612. [5 refs.]

The authors give two reasons for employing a preventive vaccine for man against undulant fever.—(1) An efficient vaccine for domestic animals has not yet been produced. (2) NICOLLE has successfully employed a preventive vaccine more especially in laboratory personnel. Infection is most common in those whose profession necessitates dealing with infected animals, e.g., veterinary surgeons and farmers, and it is these people who could and should be protected by inoculation.

The vaccine employed consists of various strains, three of melitensis (one of human origin, one caprine, one bovine) and two strains of abortus. It contains four hundred million of each strain in 1 cc., a total of two thousand millions of the five strains. No antiseptic is added but the vaccine is heated at 60° C. for one hour.

Dosage: The first injection is of 0.25 cc. 500 million germs.

Second injection, 0.75 cc. 1,500 million germs.

Third injection, 1 cc. 2,000 million germs.

The full course of injections was given to 111 persons engaged in dealing with infected animals; none of these developed undulant fever in the 3 to 8 months that had elapsed, but of thirty-six others who were not inoculated two contracted the disease.

D. H.

SANFILIPPO (E.). Ueber Immunisierung gegen Mittelmeerfieber. VII. Mitteilung. [**Immunization against Undulant Fever.**]—*Ztschr. f. Immunitätsf. u. Experim. Therap.* 1930. Vol. 69. No. 1/2. pp. 157-160. [1 ref.] [Med. Clinic, Univ., Palermo.]

A further contribution to the subject of the immunization of goats against undulant fever [see this *Bulletin*, Vol. 26, pp. 445 & 830]. The method is similar to that already described. Massive doses were employed, the washing of eight agar plates killed by heat constituting the immunizing dose and the test dose being the whole of one living culture. The immunized animals were killed three months after the infecting dose. Careful cultures were made from liver, spleen, lymph glands, bone marrow and mammary glands, but all proved sterile; whereas in the control animals examined two months later bacteria were readily recovered from the liver, spleen and lymph glands, but not from bone marrow or mammary glands.

D. H.

MEDICAL ZOOLOGY.

DOBELL (Clifford). **Researches on the Intestinal Protozoa of Monkeys and Man. IV. An Experimental Study of the *Histolytica*-like Species of *Entamoeba* living naturally in Macaques.**—*Parasitology*. 1931. Jan. Vol. 23. No. 1. pp. 1-72. [2 pages of refs.] [National Inst. for Med. Research, Hampstead, London.]

This is the latest instalment of a series of "Researches on the Intestinal Protozoa of Monkeys and Man," which started in 1928 in *Parasitology* and was continued in 1929 in the same journal; these instalments were noticed in Vol. 26 and Vol. 27 of this *Bulletin*. Concurrent and adjuvant researches on the subject, treating of the cultivation and of the action of ipecacuanha alkaloids upon entozoic amoebae, appeared in *Parasitology* in 1926, 1927, and 1928, and were noticed in Vol. 23, Vol. 24, Vol. 25, and Vol. 26 of this *Bulletin*. Before considering the latest of these researches it may be convenient to take some refreshment from these earlier portions of the crop.

Since all these papers interosculate, and all are based mainly on study of entozoic amoebae *in vitro*, precedence must be given to the paper by Dobell and LAIDLAW "On the Cultivation of *Entamoeba histolytica* and Some Other Entozoic Amoebae," in *Parasitology*, Vol. 18, 1926, p. 283 (this *Bulletin*, Vol. 24, p. 363). Here are found the history of attempts to cultivate *E. histolytica in vitro* and a fitting tribute to BOECK and DRBOHLAV whose methods of producing rich cultures of the organism have so vastly enlarged and improved the field of critical study. This now familiar method, and the author's various modifications of it, are discussed. In the B. and D. medium the amoebae do not usually or readily encyst; but in a modification of it, discovered by LAIDLAW and here fully described and debated—the method of adding solid, sterilized, rice-starch to the medium—the amoebae not only multiply enormously but also encyst freely. The encysting phase, however, is not persistent—in subcultures in the rice-starch-media for a variable number of generations cysts become fewer and fewer, and at length the amoebae die without forming cysts at all. These culture cysts are typical cysts like those normally formed in the bowel. Cyst production may be temporarily increased by cultivating the amoebae in a starch-free medium for one or two generations and then inoculating them into media containing rice-starch (though the results at first were uncertain). It was discovered also that cultures of amoebae of *E. histolytica* can be initiated as easily from culture-cysts as from living amoebae, since the cysts effect excystment when incubated in any of the media here described for cultivating free amoebae. Furthermore, it was found that cultures of amoebae can also be initiated from cysts passed in faeces, without any special treatment, although such cysts do not regularly and invariably produce good cultures, even when they have first been washed and cleansed from detrimental organisms and soluble noxa from the faeces. ("Pure" cultures from culture-cysts, it must be borne in mind, are pure only in an amoebic sense; apart from any possible alien contamination there always goes with them an appropriate bacterial *convivium* which has a profound influence on the welfare of the amoebae in culture, and this matter—the importance of the bacterial flora—is much (though not conclusively) debated here.) Another original observation recorded in this paper is loss of infectivity to kittens in *E. histolytica* as an apparent result of cultivation in media containing solid rice-starch.

Next for notice is the paper entitled "Further Observations and Experiments on the Cultivation of *Entamoeba histolytica* from Cysts," in *Parasitology*, Vol. 19, 1927, p. 288 (this *Bulletin*, Vol. 25, p. 227). These

observations are mainly corrective and elaborative. It is here said to be probable that culture from cysts of *E. histolytica* was first done by BOECK and DRBOHLAV in March 1924. It is observed that at ordinary room temperatures free amoebae of *E. histolytica* may survive up to 3 days under culture conditions; and at 37° C. for at least 5 weeks; and that cysts of *E. histolytica* may survive at ordinary room temperatures for at least 37 days, though usually they die in a few days. It is also observed here that *histolytica* cysts can hatch and deliver normal amoebae if kept at 37° C. from the moment that they reach maturity, and this in the culture environment in which they were formed. All the experimental detail relating to the resistance of amoebae and cysts and the excystment of the latter is here fully discussed.

Ancillary work of the same minutely critical character, by Dobell, LAIDLAW, *et al.*, on the action of ipecacuanha alkaloids upon *E. histolytica*, is recorded in *Parasitology* (Vol. 18, 1926, p. 206, and Vol. 19, 1927, p. 283) and has been noticed in this *Bulletin* (Vol. 23, p. 660, and Vol. 26, p. 469). The chief conclusions of the first of these two papers are that emetine and cephaeline are specific poisons for *E. histolytica* (and allied simian species), being at least fifty times more poisonous than the other alkaloids of ipecacuanha—isoemetine, psychotrine, methylpsychotrine, demethoxyemetine, or nor-emetine—under culture conditions; that strong concentrations of emetine (1 per cent. or more) are needed to kill the parasite instantaneously, though very weak solutions (1 in 50,000 or less) are fatal if allowed to act for a sufficient time; and finally, that the curative effects of emetine in amoebic dysentery are "probably" due to its direct toxic action on this amoeba. (Other experiments demonstrate *in cultu* the prepotency of emetine above stovarsol (about 10 times) and quinine (about 50 times) and its relative insufficiencies against *E. coli*, *E. gingivalis* and *Endolimax nana*.) Throughout this chemotherapeutic study inspissated horse-serum was the solid constituent and egg-serum or horse-serum diluted with Ringer's fluid the liquid constituent of the culture medium (plus solid rice-starch) and definite quantities (in solution) of the drug to be tested were added to the known volume of the liquid constituent. The chief conclusion from the experiments recorded in the second of the papers on the action of emetine is corrective of the first. The experiments show that a medium which consists of a solid mass of clotted protein in a liquid is not trustworthy for quantitative chemotherapeutic experiments, since the distribution of the chemical between the solid and the liquid varies with the nature of the solid and with time. It is shown that in a wholly liquid medium a solution of emetine 1 in five million was lethal for amoebae of *E. histolytica* (4 strains) *in vitro* within 4 days, provided that the medium did not become too acid.

Having proved that emetine is a specific poison in cultures of the *Entamoeba histolytica* parasite of man (and also of the *histolytica*-like commensal of *Macacus* monkeys) the author with the assistance of Miss BISHOP proceeded to test its action *in vivo* on the natural amoebic infestations of these monkeys. The experiments are recorded in *Parasitology*, Vol. 21, 1929, p. 446, and have been cited in this *Bulletin* (Vol. 27, p. 389). The conclusion from them is that emetine acts upon these simian amoebic infestations exactly as it does upon the amoebic infections of man and is equally a radical cure for these natural *histolytica*-like infestations. In this paper, which is No. 3 of the series of "Researches on the Intestinal Protozoa of Monkeys and Man," Dobell expresses himself satisfied that *Entamoeba histolytica* of man and the *histolytica*-like commensal of *Macacus* monkeys are identical—an opinion towards which he had seriously inclined for eleven years.

We come now to No. 1 and No. 2 of these "Researches," which are chronicled in *Parasitology*, Vol. 20, 1928, p. 357, and have been recently summarized briefly in this *Bulletin* (Vol. 26, p. 795). Here the author again acknowledges the debt to BOECK and DRBOHLAV and their discovery of a means of growing *Entamoebae* in profusion outside the body of a

host, and LAIDLAW's manoeuvre of improving this culture and procuring plentiful encystment *in cultu* by the addition of starch to the medium, is again mentioned. These discoveries, which have made it possible to procure cysts at will in culture, and to keep these "culture-cysts" for many days, and to bring them to bed in fresh cultures and incubate them to beget new generations of amoebae duly submissive to encystment *in cultu*, have made it possible to follow in culture the whole life-history of a specifically pure strain of *Entamoeba histolytica* which is here described in esoteric detail. The strain studied came originally from a *Macacus sinicus* that was under the author's observation for about 3 years. Though the monkey was known to be infested by *E. histolytica* (see below) it had never suffered from dysentery and its only other amoebic infestation was known to be *Endolimax nana*. From this monkey's faeces cysts were taken of which one part (after cleansing processes) was administered at once *per os* to a kitten of six weeks and of certified and confirmed purity, and another part was put to suitable culture and produced amoebae which were proved to be above suspicion as a pure strain of *E. histolytica*. In six days the kitten started an acute attack of typical amoebic dysentery, and from cysts recovered in pure culture from the dysenteric dejecta of this kitten this pure strain—K28c—of *E. histolytica* was started. (The author's experimental proof that this *E. histolytica* from *Macacus* is identical with the *E. histolytica* of man is offered in the next paper, No. 4.) It may be mentioned that this strain (K28c) was isolated and established in culture in 1926 and was still maintained in serial subcultivation when the author's latest paper was published in January 1931. When cysts are required the author inoculates them into the starch-free B. and D. medium, in which by incubation he gets excellent cultures of the amoebae. These amoebae are inoculated into B. and D. medium to which a little solid rice-starch has been added. At the beginning of incubation (at 37° C.) in this starch-medium abundant active amoebae along with precystic forms and immature cysts are to be found; later, up to 48 hours, an abundance of ripe cysts; still later, up to a week or so, amoebae in decreasing number, but few or no cysts, as already mentioned. By tapping the incubator at the right times trophozoite-amoebae, ripe cysts, or any other intermediate forms can be obtained for study. But to have success in this culture process the medium must be sterile before inoculation, the added rice-starch also must be sterile, the so-very-fastidious bacterial convivium [see above] must not be altered by accidental introduction of alien gate-crusher microbes, and the temperature in the incubator must be maintained continuously at 36.5–38° C.

Various other media are described as quite suitable provided rice-starch is added. The life-history of *E. histolytica* in cultures is described in infinite detail (25 pages, exclusive of formal discussion and summary) and to a full and most harmonious accompaniment of text-figures and artistic plates; the author takes no step without qualifying long-drawn-out strains of explanation. He describes the following procession: the trophic amoebae; the smaller precystic amoebae with more or less excentric caryosome; the encystment and the cysts; the excystment, and the metacystic amoebae. Here a long pause occurs in the story, for although each quadrinucleate metacystic amoeba that hatches from each quadrinucleate cyst develops into eight young trophic amoebae, it does so in a complicated series of nuclear divisions followed by cytoplasmic fissions. In the excystment a single quadrinucleate amoeba escapes from each cyst through a minute perforation in the wall. This excysted quadrinucleate "metacystic" amoeba feeds voraciously, and in two or three hours has grown large (16–20 μ). Then one nucleus divides, the other nuclei remaining at rest for a while. Then a strangely complicated series of successive nuclear divisions succeeded by cytoplasm fissions follows (through thirteen pages of description), each nuclear division being followed by a fission of the cytoplasm and a variable period of growth, until from the original quadrinucleate amoeba that came out of the cyst a new generation of

eight uninucleate amoebules has come into being. The amoebules are young trophic amoebae, not gametes or conjugants: "no sexual phenomena of any sort have been observed during the metacystic stages . . . the life-history of *E. histolytica*, as visible *in vitro*, is thus wholly asexual." Although this account of the life-history *in cultu* of *E. histolytica* is based on a stock derived from a *Macacus* monkey, the author is careful to explain that a similar life-history has been observed by him in other cultivated strains of *E. histolytica*, including a strain isolated straight from man and a human strain experimentally implanted in a *Macacus sinicus* and recovered therefrom in pure culture. The account concludes with a discussion of some points in the recorded observations of other writers on the life-history of *E. histolytica*. BOECK and DRBOHLAV have already received high appreciation as ποιμένα λαών, and are again noticed as (probably) having also been the first to obtain encystment *in vitro* and to obtain a culture by hatching cysts from stools; CHATTON (1917) obtained excystment *in vivo* and observed that the cysts hatched as active and voracious quadrinucleate amoebae whose nuclei became agglomerated "en tétraèdre"—corresponding, in short, with the author's "metacystic" amoebae; and YORKE and ADAMS (1926) made cultures by incubating cysts (from stools) in B. and D. medium, and they also observed excysted quadrinuclear amoebae; but their account of the subsequent behaviour of these amoebae perplexes the author. Seven other names are mentioned, of writers whose observations, where not accurate, are not submissive to interpretation by the author.

We now come to the memoir, No. 4. "An Experimental Study on the *Histolytica*-like species of *Entamoeba* Living Naturally in *Macacques*," that is the particular object of our regard. It contains a full account of the experimental evidence—short of the conclusive extreme that might necessitate a human sacrifice—justifying the author's opinion, first formed (on facts then more open to contention) eleven years ago, that the *Entamoeba histolytica*-like organism living as a natural commensal in the gut of monkeys of the genus *Macacus* and the *Entamoeba histolytica* parasite that usually causes amoebic dysentery in man are identical. In the memoir, for convenience, the one is styled *Entamoeba histolytica macacorum* and the other *Entamoeba histolytica hominis*.

At the outset the author explains, in order that his methods and results may not be assailed by shallow and ignorant criticism, that the animals employed in his experiments—5 *Macacus rhesus*, 4 *Macacus sinicus*, 1 *Macacus nemestrinus*, and 40 kittens mostly six to ten weeks old—were no unconsidered and ill-conditioned waifs and strays but were animals of unimpeachable credentials. He knew his monkeys well. They all were healthy and vigorous. He had pet names for them and treated them as friends; his own words are "I have devoted far more attention to their diet, health, happiness and general well-being than I have to my own." They were a tamed, trained, well-behaved family under the author's daily personal observation and were never entrusted to assistants for experiments. The 40 kittens, with few exceptions, were born in the Institute. They were bred and cared for by the author himself. They had pet names, and although they were housed separately they were often allowed out for play together. They were fed on pasteurized milk and boiled fish. They were fondled and kept amused when cysts and amoebae had to be taken and went to the operation purring. When one tries to picture the happy, healthy and interesting environment of these animals—and of the similar possibility of subsequent post-mortem proceedings—one cannot but think of the foxes hunted by the famous Mr. Jorrocks

which were said by him to enjoy the pleasures of the chase equally with the huntsmen, the horses and the hounds. We use this simile in no spirit of levity, but in a just appreciation of the author's humane resolve to keep his animals not only free from any misleading and mystifying taint but also free from pain and ennui.

The Entamoebae of the present long series of researches were derived from ten *Macacus* monkeys and two human beings. "All the strains were morphologically typical, with cysts measuring 11–14 μ diameter." Most of them have been cultivated at times in cultures that were free from all other protozoa but had an unknown though stable accompaniment of the needful bacteria. The methods of cultivation were the various modifications of the B. and D. medium devised by LAIDLAW and the author. Great stress is again put upon the necessity of a certain bacterial convivium in a culture designed to produce encystment of amoebae. "If these bacteria are absent the amoebae never encyst, no matter how much starch they may eat, or how much the other cultural factors may be varied." In the case of the strain K 28c (mentioned in previous papers) the necessary bacteria are present surely and constantly. A "discontinuous" method of protracted cultivation of many pure strains of *E. histolytica* has been devised by the author. He cultivates the active amoebae (in the usual ways) for about a week and then makes them encyst (in the starch way described). The cysts are then stored in the ice-chest at a temperature of about 8° to 12° C. for about a month. At the end of the month the cysts are hatched again, and the process is repeated as long as necessary.

At last we come to the experiments demonstrating (1) the significantly varying results of inoculating kittens with different strains of *Entamoeba histolytica macacorum*; (2) the results of inoculating different species of *Macacus* monkeys with *Entamoeba histolytica macacorum*, and (3) with *Entamoeba histolytica hominis*; and (4) to supplementary experiments on the infectivity of *Entamoeba histolytica* for kittens, and on the ingestion of human red blood corpuscles by *Entamoeba histolytica in vitro*—and then to the author's own general conclusions.

1. *Experimental Infection of kittens with E. histolytica macacorum*:—

In the early experiments living amoebae (*per anum*) or cysts (*per os*) in fresh faeces of a monkey were introduced into seven kittens. All these experiments gave entirely negative results—no amoebae in any, and no amoebic lesions found in the four post-mortem examinations made. These early experiments were made in days before the author had learnt how to cultivate *E. histolytica*.

Afterwards the author attempted to infect kittens with *E. h. macacorum* by means of culture-amoebae (*per anum*) or culture-cysts (*per os*); and pure and carefully tested strains from 4 monkeys were administered to 8 kittens. The results in 7 cases were negative; but in one case the kitten (K15), which had received culture amoebae derived from the normal faeces of a particular *Macacus sinicus* named "Bonar," on the following day passed blood and mucus, cultures from which showed abundant amoebae.

Further experiments were therefore made with this "Bonar" K15 strain and its derivatives. Six kittens inoculated either direct from

kitten 15 or from other kittens infected through the intermediation of K15 all became infected, passing mucus, blood, and many active amoebae, and showing *post-mortem* lesions, of the large gut alone, quite like those of amoebic dysentery in man; they had no serious symptoms of dysentery however—nothing like the fulminating dysentery so often seen in kittens infected by human strains of *E. histolytica*; the incubation period in these kittens, which were inoculated *per anum*, varied from 1 to 9 days. Another kitten—an animal of “extraordinary liveliness and vigour”—of a “playfulness almost pathological”—was entirely refractory to this same strain, and after resisting three powerful attempts at infection was finally discharged—a healthy half-grown cat—as “uninfected and uninfectible.” In some other experiments with this strain two kittens were fed with cysts in the concentrated faeces of “Bonar” himself; six days afterwards both contracted a “mild nontransmissible dysentery” and after recovery grew to normal healthy cats. In some other experiments culture-cysts of this usually infective strain failed to infect kittens; whether or not they had lost their infectivity in the course of continued cultivation the author cannot say; but he recalls the earlier discovery that by continued cultivation a strain of *E. histolytica hominis* lost its infectivity for kittens. All these experiments (16 pages) demonstrating and clarifying the history and behaviour of the *E. histolytica* of Macacus monkeys in kittens, are described in a detail that may be fairly described as Olympian, so resolute is the author to allow no footing to the shallow or inattentive critic.

2. *Experimental infection of Macacus monkeys with E. histolytica macacorum* :—

The next step is to inquire whether or not all the strains of *E. histolytica macacorum* isolated from the three species of Macacus monkeys at the author's service are as identical in their properties as they are in their morphology. The experiments to this end fill 9 pages, and their course and results are thus summarized by the author himself: “Attempts to transmit strains of *E. histolytica macacorum* from one species of *Macacus* to another have been uniformly successful. All the strains used were isolated in pure culture, and carefully tested and studied before trial: and all the macaques employed were previously freed from infection with *E. histolytica* by treatment with emetine, and were proved to be ‘clean’ by prolonged daily examination of their faeces—both microscopically and culturally. With such material and precautions, it has been found possible to transmit a strain of *E. histolytica* from one *Macacus sinicus* to another *M. sinicus*: a strain from *M. rhesus* to *M. sinicus*: and a strain from *M. nemestrinus* to *M. rhesus* and thence to *M. sinicus*. These experiments have shown that strains of *E. histolytica macacorum* may be cultivated in various media for any period up to about a year and a half without losing their infectivity for macaques. They have also shown that normal culture-cysts are just as infective as cysts formed naturally in the intestine. The strains of *E. histolytica* employed were all derived from healthy non-dysenteric monkeys, and produced no dysentery on introduction into their new hosts. All macaques became demonstrably infected within 4 days at most after ingestion of culture-cysts of *E. histolytica macacorum*: and in every case the induced infection persisted for the duration of the experiment (maximum period 15½ months).”

3. *Experimental infection of Macacus monkeys with E. histolytica hominis* :—

In these experiments a pure strain, or its derivatives, originally derived from a patient suffering from acute amoebic dysentery was used. The strain was isolated by DRBOHLAV in 1924, and a subculture from it has been maintained by the author ever since, cultivated for the most part in horse-serum and Ringer-eggwhite medium with rice-starch. The macaques employed had been cleansed of natural or of other previous infections by emetine treatment. The following is the author's summary of the events: "A strain of *E. histolytica*, derived from a man suffering from acute amoebic dysentery, has been cultivated *in vitro* continuously for 5½ years. After cultivation for 2½ years it was successfully transmitted to *M. sinicus*. On recovery from the experimentally infected monkey, its derivative was further cultivated for 2 years, and then transmitted to *M. rhesus*. The original strain itself has also been directly transmitted to both *M. sinicus* and *M. rhesus* after continuous cultivation for 5 years. . . . In all the monkeys (only 3 in number) infected experimentally, no dysenteric symptoms or lesions were observable at any time." The author adds that these experimental infections persisted to the end of observation (maximum 16 months).

Supplementary experiments on the infectivity of E. histolytica for kittens ; and on the ingestion of human red corpuscles by E. histolytica :—

In 1926 DOBELL and LAIDLAW discovered that a strain of *E. histolytica hominis* after it had been cultivated *in vitro* for about 2 months lost its infectivity for kittens. This fact, which some people have been unwilling to believe, was confirmed in the present experiments. In another experiment it was found that a strain of *E. h. hominis* isolated from a patient not suffering from dysentery infected a kitten quite as readily (and as savagely) as another strain isolated from a patient with acute dysentery. In another series of experiments here described and tabulated it was found that when strains of *E. h. hominis* and *E. h. macacorum* which had lost their infectivity for kittens (as a result of cultivation *in vitro*) were passed through *M. sinicus* or *M. rhesus*, their infectivity was not regained.

Great and manifold are the experiments and observations here summarized on the ability or inability of *E. histolytica* to ingest red blood corpuscles, *in vitro*. In the author's experience *E. h. macacorum* never does, and *E. h. hominis* usually does, although in certain circumstances strains that possess the power may lose it, and *vice versa*.

In the final summing-up the author pronounces in favour of the verdict that the *histolytica*-like amoeba (here called *E. histolytica macacorum*) living naturally in the monkeys of the genus *Macacus* is identical with *Entamoeba histolytica* of man. In morphology and life-history the two are identical and they develop in the same way *in vitro* under the same conditions, they also are equally sensitive to minute quantities of emetine. *E. h. hominis* is known as a destructive parasite of man and is usually able to produce a rapidly fatal dysentery in kittens ; it usually ingests red blood corpuscles ; but in cultivation *in vitro* it ingests bacteria and starch-grains, etc., just like *E. h. macacorum*, and may lose its power of infecting kittens and ultimately may also lose its ability to ingest human red corpuscles. *E. h. macacorum* is usually known as a harmless commensal feeding on bacteria and

faecal debris and unable to ingest red blood corpuscles ; frequently it is quite unable to infect kittens or may cause in them a mild dysentery ending spontaneously and with possible complete recovery ; moreover it has been said to be able to ingest human red corpuscles *in vitro*—although this is contrary to the author's experience with amoebae derived from perfectly healthy monkeys. The differences between *E. h. hominis* and *E. h. macacorum* are thus seen to be inconstant and variable—and so not of specific import.

The following are the author's own general conclusions :—

" The main conclusion to be drawn from all the experiments here described is that the *histolytica*-like *Entamoeba* living naturally in *Macacus rhesus*, *M. sinicus*, and *M. nemestrinus* (and probably in other species of the genus) is identical with *E. histolytica* of Man. All the evidence hitherto obtained supports this interpretation, and no sound arguments can be urged against it.

" Other conclusions which can be drawn from all my researches in the present connexion—including those published previously—are of more general interest. It has been shown that monkeys of the genus *Macacus* (= *Silenus*) are natural hosts of *E. histolytica*, and can therefore be used instead of human beings for experimental study of this parasite. It has further been shown that it is now practicable (1) to isolate any desired strain of *E. histolytica* from a man or a macaque, and maintain it *in vitro* for any required period : (2) to obtain at will any stage in its life-history *in vitro* at any given moment : (3) to introduce this strain into a natural host (*Macacus*), study its behaviour therein, and recover it in culture whenever necessary : and (4) to eradicate it from this host permanently, if desired, by chemotherapeutic methods. Host and parasite can thus be kept separate, can be united, and can again be separated *ad libitum* ; and any desired experiments can therefore be performed with either severally or with both combined. I believe that we possess, at present, such complete experimental control over no other animal endoparasite."

A. Alcock.

ERRATUM.

Vol. 28, No. 7, p. 531, footnote. Translation from Horace For 'Whate'er the preconceptions are' read 'Whate'er thy preconceptions are.'

YELLOW FEVER.

LEAGUE OF NATIONS MONTHLY EPIDEMIOLOGICAL REPORT. 1931.
Apr. 15. Vol. 10. No. 4. pp. 139-147. With 2 maps. [2 refs.]
—**Yellow Fever from 1927 to the Beginning of 1931.** [In parallel
French & English.]

A general review of the incidence of yellow fever during the past four years. In Africa since the height of its prevalence in 1927, when cases occurred in the various countries from Senegal in the north to Belgian Congo in the south, and showed great virulence (e.g., 117 cases with 111 deaths in Senegal, 107 cases with 40 deaths in the Gold Coast), the number of cases has gradually diminished, until in 1931 only four suspected cases and one death have been recorded, all in the Mamfe province, Cameroons.

In South America, on the other hand, there has been a marked increase in the prevalence of the disease during the past 4 years. In addition to the Rio epidemics of 1928 and 1929, cases have been recorded from various other parts of Brazil and from Colombia. During the present year (1931) 34 cases have been recorded occurring in more than 13 different and widely scattered localities ranging from the state of Rio in the south to Ceara in the north, and inland to Palma. The lack of connexion between these cases strongly suggests that the disease may persist for a long time in the interior of the country without being revealed by epidemic outbreaks. Moreover, the fact that it attacks more particularly foreigners supports the view that the infection persists under a more or less latent form in the native population.

Attention is drawn to the danger of commercial air services, the necessity of avoiding infected zones in the establishment of routes, or of edicting special measures for such zones. Finally the interdiction by law to import or keep yellow fever virus for any purpose whatever in Eastern countries open to contamination has been adopted by the Philippines, British India, British Malaya and Australia. [The statement to the effect that the passage of yellow fever virus through *Macacus rhesus* markedly increases its virulence is entirely without foundation.]

E. Hindle.

SMITH (H. F.). **Résumé of Report on Sanitation and Yellow Fever Control in Liberia.**—*Public Health Rep.* 1931. June 5. Vol. 46. No. 23. pp. 1353-1359. With 8 figs. on 4 plates.

The author, an officer of the United States Public Health Service, was detailed to act as medical adviser to the President of Liberia, and his report is a striking condemnation of the Liberian Government so far as sanitary measures are concerned.

The officials were not in sympathy with yellow fever control measures, and many of them expressed disbelief in the existence of the disease. On June 3, 1930, a case of imported yellow fever occurred in Monrovia, diagnosed by one of the two European physicians, but as soon as the diagnosis was made the family of the patient discontinued his services, and employed a native doctor. The patient died three days later and the cause of death was given as "strangulated hernia."

The author was not allowed to examine the mortality records, but by appealing to the President was able to see the city burial permits from May 1 to September 1, after which permission was again refused.

The conditions of Monrovia throughout the year are ideal for the propagation of *Aedes* and 96 per cent. of the premises inspected in the city were found to be breeding mosquitoes. From the information available the author considers that yellow fever has existed in Monrovia for a long period of time, though it is impossible to estimate the number of cases owing to the absence of records. However, 10 weeks' prophylactic measures directed solely toward correcting conditions favouring the spread of yellow fever resulted in a diminution of the number of deaths in May by more than 75 per cent. as compared with any previous May. It is not improbable that the marked increase in the number of deaths which had occurred previously at this time of the year was actually due to yellow fever, and the success of the author's short sanitary campaign shows the value of such work. It is to be regretted that the measures recommended by the author were not adopted by the Liberian Government.

E. H.

RAMSEY (George H.). **Yellow Fever in Senegal with Special Reference to the 1926 and 1927 Epidemics.**—*Amer. Jl. Hyg.* 1931. Jan. Vol. 13. No. 1. pp. 129–163. With 3 folding maps. [37 refs.]

It was found that even in the coastal towns of Senegal the temperature was high enough to permit the survival of adult *Aedes aegypti*, and therefore the disease could exist throughout the year. Owing to the scattered population the colony is considered to be a potentially epidemic rather than an endemic yellow fever area. Moreover, the record of epidemics at irregular intervals since 1778 supports this view. Although during the 1926 and 1927 epidemics all the reported cases were among white persons, the number was insufficient to explain its wide geographical distribution, and the author is of the opinion that the natives must have been attacked in numbers greatly exceeding its incidence among the white population. It is concluded that the natives must have constituted a vast but hidden reservoir of infection.

[The statement on p. 129 "The man sick with yellow fever remains infective only for a very few days, probably not more than three or four" is not supported by experimental work on monkeys, which shows that the blood is infective to mosquitoes during the incubation period before the onset of fever (see HUDSON and PHILIP, this *Bulletin*, Vol. 27, p. 489).]

E. H.

FRAGA (Clementino) et al. A febre amarella no Brasil. Notas e documentos de uma grande campanha sanitaria. [**Yellow Fever in Brazil. Notes on an Extensive Sanitary Campaign.**]—*Brasil-Medico*. 1930. Sept. 27 & Oct. 4. Vol. 44. Nos. 39 & 40. pp. 1081–1086; 1113–1120.

After a few remarks on previous epidemics in 1685, 1850, and 1908, the author describes more minutely that of 1928–29. The first patient was a soldier dying on the 16th day of a disease diagnosed as influenza; three days later another soldier died and the nature of the infection was determined at necropsy. These and two others occurred during the last week of May 1928. By the end of the year there had been

125 cases, 73 of them fatal. Of these 52 were notified in June, 40 in July. Very few occurred in the last 3 months of that year, but in January 1929 the numbers increased to 29, in February 54, in March 241, in April 190, a fall to 87 in May, and after that 9, 1, 0 and 2 only in successive months and the last two contracted the disease in Nichtheroy. This gives a total for 1929 of 613 of whom 363 died, and for the whole epidemic 738 with 436 deaths (59.07 per cent.). Tables are presented showing the distribution, so far as it could be ascertained, as regards age, sex, race, and length of residence. 115 were under 15 years, and of these 78 died (67 per cent.); 538 were above this age and 350 died (65 per cent.); the ages of the remaining 85 were not known. As regards sex, 561 were males of whom 338 died (60 per cent.) and 177 were females, and of these 98 died (55 per cent.). Length of residence could be ascertained in 450 only, and of these 360 had been in the locality less than 3 years.

Measures undertaken for combating the outbreak are grouped under two main headings, those dealing with the mosquito, and those with man. Under the former are included antilarval measures as applicable to estates, streams, bushy ground, fallow land and ships. The adult insect was attacked by catching in houses and by disinfection by means of Clayton apparatus, and by sprays, petrolization and so forth. The area to be dealt with was divided into districts, inspectors appointed for each with assistants to treat the conditions found. Under the latter—treatment of patients, contacts and suspects—the measures consisted of isolation of patients, close observation of others, protection by mechanical means as by use of mosquito nets, and by immunization. A few words are added on the application of these various measures to different districts, Rio de Janeiro, S. Paulo, Minas and others.

H. H. S.

CARNEIRO (Homero). Considerações sobre o surto de febre amarella em Nova Iguassú (1929–1930). [**The Outbreak of Yellow Fever in Nova Iguassú, 1929–30.**]—*Folha Med.* 1931. Apr. 5. Vol. 12. No. 10. pp. 109–112. With 1 chart in text.

Nova Iguassú, the chief town of Iguassú, an hour's distance by rail from the Federal District of Rio de Janeiro, was the seat of an outbreak of yellow fever between March 1929 and September 1930. The author describes the general condition of the locality, the large number of pools, insufficient drainage, etc., favourable to the breeding of mosquitoes. As soon as suspicions arose as to the nature of the disease a force of inspectors, nurses and visitors was got together, the area involved being divided into five zones. A small hospital of 10 beds was erected. The inspectors made house to house visits, notified any suspicious cases, took their temperatures and sent off specimens of urine for examination. Out of a population of 6,000, thirty-two were removed and the diagnosis was confirmed in 26. Fourteen of these were among 5,400 natives, and 12 among 600 foreigners; 23 were white and 3 coloured persons; 19 male, 7 female. Two were between 1 and 10 years, eight between 11 and 20, ten in the third decade, two in the fourth, three in the fifth, and one was over 50 years. There were 18 deaths. The sanitary squads destroyed all the mosquitoes they could

find, by killing and by disinfection of dwellings, and took the usual methods of dealing with pools and other breeding sites.

H. H. S.

WARD (Espine). **A Case of Yellow Fever, with Recovery.**—*West African Med. Jl.* Lagos. 1931. Jan. Vol. 4. No. 3. pp. 67–68.

The record of a non-fatal case of typical yellow fever in a British woman, occurring during July 1930 near Cape Coast Castle, Gold Coast. The last recognized case in this locality occurred three years previously. The diagnosis was confirmed by inoculation into monkeys.

E. H.

PETTIT (Auguste). Rapport sur la valeur immunisante des vaccins employés contre la fièvre jaune et la valeur thérapeutique du sérum antiamaril. [**A Report on the Protective Value of Yellow Fever Vaccines, and the Therapeutic Value of Immune Serum.**]—*Bull. Acad. Méd.* 1931. Mar. 31. Year 95. 3rd Ser. Vol. 105. No. 13. pp. 522–526.

The French Academy of Medicine, in order to answer questions from the Government on the yellow fever problem, appointed a committee composed of ROUX, BERNARD, RENAULT, Pettit and MARCHOUX, and the present report comprises their conclusions.

HINDLE's results are reproduced in which out of 50 rhesus monkeys receiving one dose of his vaccine followed at various intervals by active virus, 39 were protected and 11 died of yellow fever. Pettit and STEFANOPOULO obtained better results by using two injections; for of 11 monkeys protected in this manner and inoculated with a large dose of very active virus 10, 15 and 20 days respectively after the last injection, all survived. In addition monkeys were protected by inoculating a mixture of virus and horse or monkey immune serum.

A report from CHAGAS as to the results of vaccination in Rio, states that at first in some localities it was successful; later, failures were observed, but it is thought that the dose (2 cc.) was hardly sufficient. The vaccine was tested in monkeys some of which were completely protected but in other cases this immunity broke down. Summarizing the various reports the committee state that "the principles which have guided HINDLE and his followers seem reasonable, but the practical conditions of application should be the subject of further studies."

Attention is then directed to the observations of Pettit, STEFANOPOULO and FRASEY [see this *Bulletin*, Vol. 26, p. 307] on the protective value of horse serum immunized against yellow fever, and its possible use in the treatment of cases of the disease.

Finally it is concluded that at the present time no method of vaccination, serum therapy or of chemotherapy has been sufficiently studied to put into practice. Convalescent serum is of protective value, if required for human therapy. That of the horse and monkey is prophylactic and curative in the monkey but its effects in man are uncertain. In the case of vaccination, it is necessary to be sure that the vaccine is harmless and to have precise details of its preparation and efficacy. Chemotherapy has not yet furnished any practical results.

E. H.

ARAGÃO (Henrique de Beaurepaire). Sôro-virus vacinação na febre amarella. [**Protection against Yellow Fever by the Combined Use of Serum and Virus.**—*Brasil-Medico*. 1931. Jan. 17. Vol. 45. No. 3. pp. 49-51.]

Much information is compressed into this short paper. The author first speaks of the three modes of protection employed: 1. Passive immunization by injection of the serum of a recovered human patient or of an immunized monkey. This he has found very serviceable in doses of 1-4 cc. for those working on yellow fever in laboratories or in places where they are liable to be bitten by mosquitoes. Over 200 have been thus inoculated at the Oswaldo Cruz Institute, and none has been attacked by the disease. 2. Active immunization by emulsions of organs of infected monkeys (the original method of HINDLE); for man the author gives 2 cc., and states that during the 1928-29 epidemic some 25,000 were vaccinated [no mention is made of any cases arising among these]. 3. Combined serum virus inoculation; for man 4 cc. (for *rhesus* 1-2 cc.) of serum of a recovered patient are injected, and 24 hours later 0.1 cc. of virulent blood or its equivalent in dried blood [the author states in a footnote that 1 cc. of blood is reduced, when dried, to 0.165 gm.; hence 0.1 cc. = 0.016 gm.]. Twelve days later injection of 0.1 cc. of virus consolidates the immunity. Details of 5 *M. rhesus* so treated are given demonstrating resistance to subsequent inoculation with virulent blood. The dried blood if kept at low temperature was found to retain its virulence unimpaired for a year.

Further experiments were undertaken to show that a smaller quantity of serum (0.5 cc.) was also effectual when given intravenously, but that by the ordinary subcutaneous route less than 1 cc. was ineffectual for *rhesus* and 4-5 cc. should be the dose for man. Attempts to obtain serum by inoculation of horses were not satisfactory, the product having but low protecting power. Lastly, in place of the serum and virus being injected on different days, they were given in different parts of the body on the same day. Though the animals did not succumb to subsequent inoculation of virus they reacted with fever more or less prolonged.

H. H. S.

DAVIS (Nelson C.). Uso experimental de uma vaccina cloroformada contra a febre amarella. [**Experiments with a Chloroformed Vaccine in the Prophylaxis of Yellow Fever.**—*Brasil-Medico*. 1931. Mar. 21. Vol. 45. No. 12. pp. 268-270. [6 refs.]]

The use of a chloroform vaccine prepared from yellow fever organs, liver and spleen, is not new, and reference is made to the work of MONTEIRO (see this *Bulletin*, Vol. 27, pp. 493 and 877), after which details are given of the preparation of the vaccine employed in the experiments related in the sequel. It is a modification of Kelser's original method.

(a) The liver of an animal (*M. rhesus*) just dead of yellow fever is removed, cut small, washed in physiological saline (to remove excess of blood) and weighed; (b) the fragments are triturated with sand and saline is added gradually, 1 cc. to each gram of tissue; (c) it is then filtered through at least four layers of gauze (to hold back any particles that will not pass a hypodermic needle No. 20) and placed in flasks to hold 30 cc. (d) Chloroform to 1 per cent. is added and the product kept on ice with frequent shaking for several days.

Five series of experiments were performed. The details of each are given and the principles of them consisted in inoculating *M. rhesus*, usually six (in two experiments three), with one or more doses of vaccine at various intervals after the date of preparation, from 5 up to 83 days, noting any disturbance produced, and after a further interval testing immunity by injection of yellow fever virus, in the usual way. It is worthy of note that in one series of 3 animals in which a mixture of two vaccines, each 28 days old, was injected, two died of typical yellow fever 10 and 11 days later. MONTEIRO reported the death of a monkey inoculated with a formol (2 per cent.) phenol (5 per cent.) vaccine prepared 27 days before, but the incubation period was prolonged 23 days (*Archivos Hygiene*. Rio de Janeiro, iii.2.141).

The tests were too few to justify general conclusions, but it may be stated that vaccine prepared as above retained its virulence for 4 weeks at least when kept at a temperature of 10° C.; that 1 cc. of the vaccine, prepared less than 3 months before, did not protect against a dose of virus administered 40 days after the vaccine, and finally, it is concluded that, if there is a period in which it is avirulent and at the same time effective in conferring good immunity, such period is of short duration.

H. H. S.

SCHÜFFNER (W.), DINGER (J. E.) & SNIJDERS (E. P.). Immuniseeringsmogelijkheden bij gele koorts. [**A Possible Method of obtaining Immunity against Yellow Fever.**—Reprinted from the *Versl. d. k. Akad. v. Wetensch. te Amsterdam, Afd. Natuurk.* 1930. Vol. 39. No. 9. 2 pp.]

Yellow fever does not occur in the Dutch East Indies and the suggestion arose that this absence might be due to the general prevalence of dengue. There were obvious objections to yellow fever experiments being undertaken in Sumatra where *Aedes aegypti* abounds and the Government asked for tests to be carried out in Holland.

Snijders accordingly sent from Medan to Amsterdam mosquitoes (*Aedes aegypti* and *Aedes albopictus*) which had fed on dengue fever patients, and volunteers were infected in Amsterdam by these mosquitoes. One of the authors (J. E. D.) was thus bitten and he had a year previously suffered from a mild attack of yellow fever, and a month prior to this experiment his blood was found to protect *M. rhesus* against yellow fever virus. He showed symptoms of dengue, thus proving that yellow fever did not immunize against dengue.

One experiment with 3 rhesus to test the opposite of this was not conclusive; the control and one of the two injected with the blood of dengue patients [? via mosquitoes] died after injection with yellow fever virus [interval between inoculation of the two viruses not stated]. The other when killed showed none of the signs of yellow fever and its blood did not cause the disease when injected into another rhesus.

Twenty rhesus were procured for further tests. These were infected either by the bites of mosquitoes or by injection of the blood of one of the dengue-infected volunteers. Some died of intercurrent disease, others of an undiagnosed condition; hence the possibility of dengue being fatal for monkeys must not be overlooked. Eight remained and were inoculated with yellow fever virus. Two died of yellow fever (as did the controls), the others remained healthy, and it is inferred

therefore that "soon after passing through an attack of dengue, rhesus exhibits a relatively strong immunity to yellow fever."

It was found that *Aed. albopictus*, which is common in D.E.I., can also take up and retain the yellow fever virus, but transference of infection by it is much less constant. Of 10 monkeys bitten by them only one died of yellow fever. Eight of these were re-inoculated with virulent yellow fever virus, 5 died (one of intercurrent disease) and 3 survived. [This also is not conclusive without further details, the first (mosquito) inoculation may have caused a mild attack or perhaps an *infection inapparente*.]

A further point of interest was noted, namely that lowering of temperature seemed to affect the infectivity of the virus in *Aedes aegypti*. The mosquitoes having been kept for some days in a room at 16° C. were then allowed to bite monkeys. None of the latter died but all proved to be immune when re-inoculated with infective virus. This behaviour of "cooled mosquitoes" needs further investigation, and, as the authors state, the above results, relative to dengue and yellow fever, obtained in monkeys may not necessarily prove valid for man, but if confirmed they may open up another method of procuring immunity to yellow fever.

H. H. S.

DAVIS (Gordon Ernest). **Complement Fixation in Yellow Fever in Monkey and in Man.**—*Amer. Jl. Hyg.* 1931. Jan. Vol. 13. No. 1. pp. 79-128. With 5 graphs. [40 refs.] [Yellow Fever Labs., Internat. Health Division, Rockefeller Foundation, Lagos, Nigeria, & School of Hyg. & Public Health, Johns Hopkins Univ., Baltimore.]

The author gives a detailed account of his experiments on the elaboration of a complement fixation test in yellow fever and the results of its application in a large number of monkeys and human beings. The most satisfactory antigen was found to be plasma or serum virus, obtained by collecting the blood of infected monkeys on the first or second day of fever. Both virus and complement were inactivated simultaneously by heating at 55° C. for 15 minutes. When titrated against convalescent monkey serum diluted 1:10, the serum virus antigen fixed complement in dilutions 1:50 to 1:1,000. The majority of the tests were made with the antigen diluted 1:100. The removal of native complement was effected by heating at 55° C. for 15 minutes, not longer. Serum and antigen were allowed to remain in contact for 10 to 25 minutes before adding complement, and the mixture then kept at 6° to 8° C. for 15 to 18 hours. The anti-sheep rabbit serum and sheep red cells were then added separately and the tubes incubated at 37° C. for one hour.

The author tested the sera of more than 400 monkeys and 27 persons who had survived illnesses diagnosed as yellow fever and his conclusions are supported by protocols giving the results of the experiments. Unfortunately this complement fixation test, although giving such very definite results with monkeys, entirely failed when applied to human sera, possibly owing to the complexity of the antigen. Consequently, the present method can be of no assistance in determining endemic areas of yellow fever. Sera from monkeys that had recovered from an undoubted attack of yellow fever invariably fixed complement in the presence of serum virus antigens, whilst sera from

normal monkeys never fixed complement. The sera of monkeys that had survived successive doses of active yellow fever virus but without showing any thermal reaction also fixed complement, to the same degree as ordinary recovered monkeys. Sera from monkeys that had been vaccinated in various ways failed to fix complement; but when the vaccine was followed by a dose of active virus, some of the sera fixed complement whilst others did not. Sera from passively immunized monkeys also failed to fix complement after the inoculation of active virus unless there was a thermal reaction indicating incomplete protection. The antibody content of sera from convalescent monkeys was found in many cases to remain fairly constant for several months. In other cases it diminished after some weeks but its strength could be restored by the inoculation of either fresh or inactivated virus. Evidence of a true antigen-antibody relationship was afforded by the successful passive sensitization of both guineapigs and rabbits. Moreover the rapid rise in the titre of the serum of a protected monkey following the inoculation of macerated infected mosquitoes is additional evidence of biological specificity.

[The original paper should be consulted by those interested in further details of the author's work on this subject.]

E. H.

FROBISHER (Martin), Jr. **Results of Complement Fixation Tests with Yellow Fever Antigens.**—*Jl. Preventive Med.* 1931. Jan. Vol. 5. No. 1. pp. 65-78. [20 refs.] [Yellow Fever Lab., Rockefeller Foundation, Bahia, Brazil.]

A continuation of the experiments on complement fixation previously recorded by the author [see this *Bulletin*, Vol. 26, p. 1004]. The test has given about 87 per cent. correct reactions with serum from 159 human beings and 175 monkeys, but the accuracy of the test is probably about 90 per cent. as some of these cases may have been incorrectly diagnosed. With yellow fever antigens the test seems to be highly specific and there is no good evidence of undue interference by other diseases, although it is possible that some of them, especially syphilis, may occasionally cause falsely positive reactions.

The concentration of complement fixing bodies reaches its maximum in the blood of monkeys after 30 to 40 days and remains in the circulation for a few months to more than a year. After disappearance of these complement fixing bodies a second injection of virus will restore their strength in the absence of fever, these results confirming the observations of DAVIS [see above].

With regard to the testing of monkeys and human beings for immunity to yellow fever it is recommended that the serum should not be collected until 30 days following infection, as the results are likely to be more reliable.

E. H.

FROBISHER (Martin), Jr. **Antigens and Methods for performing the Complement-Fixation Test for Yellow Fever.**—*Amer. Jl. Hyg.* 1931. Mar. Vol. 13. No. 2. pp. 585-613. [13 refs.] [Yellow Fever Lab., Internat. Health Division, Rockefeller Foundation, Bahia, Brazil.]

This paper is mainly concerned with attempts to find a more satisfactory antigen for use in complement fixation tests for the diagnosis

of yellow fever. As previously recorded by the author [this *Bulletin*, Vol. 26, p. 1004], antigen prepared from the livers of monkeys dead of yellow fever, and extracted by the use of hypertonic salt solution or freezing and thawing were found to be the most satisfactory. These extracts tended to become anticomplementary when stored in cotton stoppered flasks, but in sealed ampoules could be preserved for several months. Attempts to "reconstruct" old antigens were unsatisfactory. Heating to 56° C. destroyed liver antigens. Eosin, even in high dilutions, produced strong anticomplementary properties, and the use of alcohol to inactivate the virus is inadvisable because of the formation of anticomplementary precipitates. Liver that had been desiccated *in vacuo* and stored for some time acted as an antigen but was not so satisfactory as fresh liver. The majority of monkey sera were found to contain relatively large amounts of anti-sheep amboceptor; this may be a possible cause of some of the falsely negative tests. The sera of infected monkeys collected during the early febrile stage served as satisfactory antigens, but were not so good as the best liver antigens. Berkefeld filtrates of saline extracts of infected mosquitoes gave strong reactions with immune monkey sera. Normal mosquitoes also reacted to some extent as antigen but gave non-specific results.

The injection of small amounts of monkey protein, such as vaccine, into human beings may give rise to confusion when complement fixation tests are made in which monkey tissue extracts are used as antigen; for the injection of human serum into monkeys was found to engender antibodies which fixed complement when an antigen of human serum was used.

E. H.

FROBISHER (Martin), Jr. Further Observations on the Filtrability of Yellow Fever Virus.—*Amer. Jl. Trop. Med.* 1931. Mar. Vol. 11. No. 2. pp. 127-137. [12 refs.] [Yellow Fever Lab., Internat. Health Division, Rockefeller Foundation, Bahia, Brazil.]

The mosquito virus was found capable of passing through Berkefeld "V" filters suspended in distilled water (pH 6.4), physiological sodium chloride solution (pH 6.2), or phosphate buffer solution (pH 7.8), but in all cases the suspension had been made less than ten minutes before filtration, owing to the instability of mosquito virus in aqueous fluids. Hydrogen ion concentrations between 4.8 and 7.8 did not seem to differ greatly in their detrimental effect upon the virus.

The author's experiments suggest that as soon as the virus is inactivated it undergoes chemical or physical changes interfering with its adsorption, and various theories are discussed concerning the influence of serum on the virus.

Of special interest are the results of the inoculation of mosquito virus (unfiltered) obtained by grinding up infected mosquitoes in distilled water. One of these monkeys died of yellow fever on the 23rd day without showing any fever; another only showed fever on the 28th day and the animal died 5 days later with typical gross lesions; a third monkey showed no fever until the 31st day and died two days later with typical gross and microscopical lesions.

E. H.

KERR (J. A.). **Use of Icterus Index and Bromsulphalein Test in Experimental Yellow Fever.**—*Amer. Jl. Trop. Med.* 1931. Mar. Vol. 11. No. 2. pp. 139–143. [2 refs.] [Yellow Fever Lab., Internat. Health Division, Rockefeller Foundation, Bahia, Brazil.]

The author has investigated the value of these two tests, making about 600 determinations of each on 114 rhesus monkeys infected with yellow fever. An icterus index in these animals, of 10 or more units on the second day of fever and of 15 or more on the third and fourth days, was found to indicate a fatal prognosis. With values less than these a mortality of 12 to 23 per cent. may be expected. In the bromsulphalein liver function test, the retention of 10 per cent. or more of the dye on the second day of fever, and of 15 per cent. or more on the third day, indicated a fatal infection. With values less than these a mortality of 35 per cent. may be expected. The icterus index was found to be the more accurate of these tests, and also much easier to determine.

E. H.

WAKEMAN (A. Maurice) & MORRELL (Clare A.). **Chemistry and Metabolism in Experimental Yellow Fever in *Macacus rhesus* Monkeys. III. Blood Sugar and Liver Glycogen.**—*Arch. Intern. Med.* 1931. Jan. Vol. 47. No. 1. pp. 104–115. With 2 charts in text. [16 refs.]

This is the third part of the authors' observations on the chemistry and metabolism of experimental yellow fever in monkeys [for preceding reports see this *Bulletin*, Vol. 27, p. 876 and Vol. 28, p. 293]. By examining monkeys at different stages of the disease and grouping the results it is clearly shown that hypoglycaemia is regularly present in yellow fever monkeys 24 hours before death and becomes more pronounced towards the end. In every case tested the blood sugar finally fell to a level at which convulsions might have been expected, less than 45 mgm. per 100 cc.; nevertheless definite symptoms of hypoglycaemic shock were not observed and intravenous injections of dextrose had no obvious beneficial action [see FINDLAY and HINDLE, *loc. cit.* p. 293].

Hypoglycaemic shock was found to be difficult to produce in monkeys. After hypoglycaemia had appeared, little glycogen was found in the livers of yellow fever monkeys, and the hyperglycaemic action of epinephrine was greatly diminished or abolished. The change in the carbohydrate system preceded the deamination and urea formation previously described.

E. H.

DINGER (J. E.). **Gelbfieber bei weissen Mäusen. [Yellow Fever in White Mice.]**—*Zent. f. Bakt.* I. Abt. Orig. 1931. June 24. Vol. 121. No. 3/4. pp. 194–212. With 4 text figs. [12 refs.] [Roy. Colonial Inst., Amsterdam.]

The author has confirmed THEILER's observation [see this *Bulletin*, Vol. 27, p. 872] as to the susceptibility of mice to intracerebral inoculation with yellow fever virus and gives details of the pathological changes observed in infected mice. When mice are inoculated intracerebrally the lethality is generally 100 per cent.; other methods of

inoculation are less certain, and the brain may fail to show any sign of infection and the animal remains susceptible. As found by THEILER, the virus is strongly neurotropic and no matter what form of inoculation is employed can only be recovered from the nervous system and the suprarenals. The author was unable to find any specific eosinophile inclusions in the ganglion cells of infected mice.

Various attempts were made to filter the mouse virus, and when the infected brains were suspended in physiological saline the results were negative; later the addition of 10 per cent. rabbit serum to these suspensions showed that the mouse virus would readily pass through filters, the previous failures presumably being due to the deleterious action of the saline.

This effect was also observed in some experiments to determine the influence of immune serum on mouse infections. The earlier attempts gave very uncertain results, but when the virus was suspended in 10 per cent. rabbit serum, then passed through a Seitz filter and mixed with various sera before the mixture was inoculated intracerebrally into mice, different results were obtained. Yellow fever immune serum prevented the development of any encephalitis or other symptoms of yellow fever in the inoculated mice, whilst those inoculated with a mixture of virus and normal serum all died with typical signs of the disease.

Monkeys were inoculated with the brain emulsions of infected mice after 1, 2, 3, 4, 8, 12 and 18 mouse passages respectively, and all developed typical yellow fever, no diminution in virulence being observed. It is noted that infected mice should be killed about the 8th day, as there seems to be a slight falling off in the infectivity of the brain just before death. The infection produced in monkeys by the mouse virus shows no neurotropic characters, but is of the typical septicaemic type.

Of especial interest are the author's experiments with mosquitoes, which were successfully infected by feeding them on a serum suspension of the brains of infected mice at the 10th to 12th passage. These mosquitoes were fed on rhesus monkeys 26 days later and produced typical infections of yellow fever.

E. H.

THEILER (Max). Neutralization Tests with Immune Yellow Fever Sera and a Strain of Yellow Fever Virus adapted to Mice.—*Ann. Trop. Med. & Parasit.* 1931. Mar. 31. Vol. 25. No. 1. pp. 69-77. [1 ref.] [Harvard Med. School, Boston.]

The author has made neutralization tests in mice with 13 human immune yellow fever sera. The tests were made by mixing the immune serum with varying strengths of a virus suspension, prepared by breaking up the brain of a mouse dying after intracerebral injection of passage virus, and inoculating the mixture intracerebrally, either immediately, or after standing at room temperature* for some time. A mixture of equal parts of serum and 1:100 virus kept at room temperature gave satisfactory results, and it is shown that when tested in mice all the sera showed a greater or less degree of protection.

E. H.

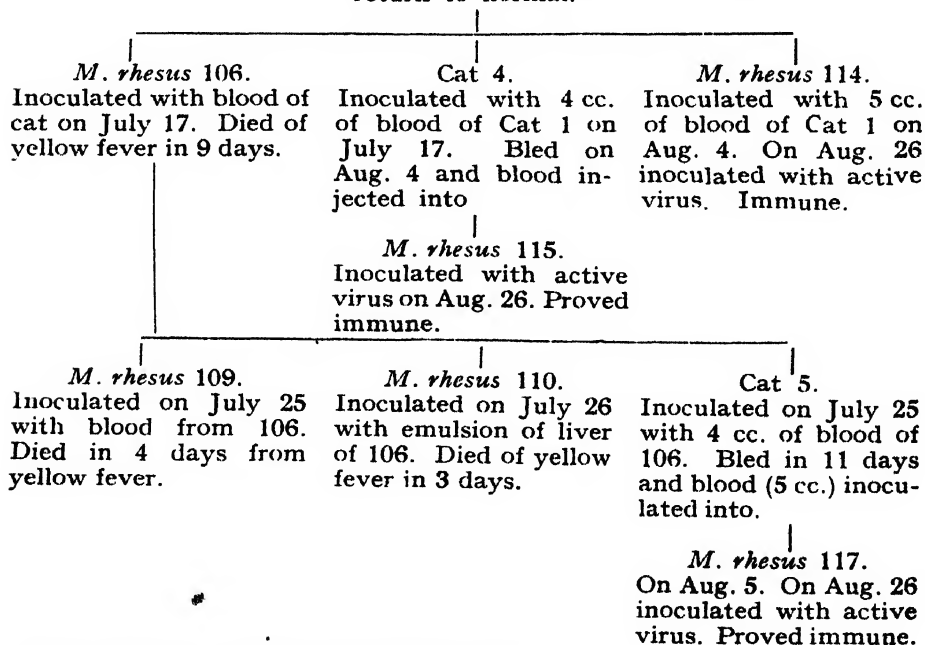
MONTEIRO (J. Lemos). Sobrevivencia do virus amarellico no organismo de certos animaes domesticos. [**Survival of the Yellow Fever Virus in Certain Domestic Animals.**—*Brasil-Medico*. 1930. Sept. 27. Vol. 44. No. 39. pp. 1087-1093. With 4 charts in text. [1 ref.] English summary. [Butantan Inst., Butantan.]

The author investigated the question of the possible survival of the virus of yellow fever in animals living in close contact with man. He inoculated a dog subcutaneously with virus from a *Macacus rhesus*. Three days later he injected 5 cc. of the heart blood of the dog into another rhesus; 21 days later he inoculated the latter with yellow fever virus which killed a control in 8 days. The monkey sickened some weeks later but this was due to tuberculosis, no signs of yellow fever being found post mortem. Twenty-three days after the first inoculation the dog was given another dose of virus (emulsion of infective liver of rhesus); 4 days later 5 cc. of its blood was inoculated into a rhesus which after a further interval of 20 days was inoculated with virus, as in the former experiment, and proved to be immune. Ten days after the second inoculation of the dog, 5 cc. of its blood was injected into a rhesus, and 14 days later the monkey was given a dose of the virus which produced a non-fatal attack of yellow fever.

The experiments with cats were also of great interest; the following scheme represents the results of one series:—

Cat 1.

Inoculated intraperitoneally with virus, July 5. Bled on 12th and 30th days after. Fever from 8th to 16th days after inoculation then return to normal.



The following are the conclusions drawn :

1. Yellow fever virus injected into the dog remains for a few days in the body and its blood injected into a *M. rhesus* sets up a febrile reaction after which the monkey is immune.

2. Injected into the cat the virus causes, after 8 days' incubation, a febrile reaction, and its blood after 12 days transmits a typical and fatal infection to rhesus; after 30 days the virus from the cat will bring about immunity of the rhesus.

3. These animals may, therefore, play an important part epidemiologically, as carriers of the virus.

H. H. S.

DINGER (J. E.), SCHÜFFNER (W. A. P.), SNIJDERS (E. P.) & SWELLEN-
GREBEL (N. H.). Onderzoek over gele koorts in Nederland.
(Zesde (laatste) mededeeling.) [**Yellow Fever Research in Holland.
Sixth and Last Communication.**].—*Nederl. Tijdschr. v. Geneesk.*
1931. June 6. 75th Year. 1st Half. No. 23. pp. 2964-2972.
[64 refs.]

In this article the present position is summarized regarding (1) the susceptibility to and character of the infection produced in various species of animals, and (2) the immunity attainable by means of vaccine or by modification of the virus with passage or through allied diseases. The *Macacus rhesus* is not the only monkey which may be used as a test animal; other species have been shown to be more or less susceptible. In guineapigs the bite of the mosquito and intraperitoneal inoculation of filtered and unfiltered blood and organ emulsions produced an infection which was fatal in 50 per cent. of cases. A typical yellow fever could be produced in the rhesus monkey with material of the first guineapig passage but not with subsequent passages. The disease was devoid of symptoms in the guineapig and of more than one month's incubation. THEILER's discovery that white mice can be infected by intracerebral inoculation was confirmed: all the animals die, usually within 8 days, from acute encephalitis often accompanied by gastric haemorrhages, fatty degeneration of the liver and swelling of the adrenals. The virus is essentially neurotropic in this animal and is distributed throughout the nervous tissues. Thus the virus of yellow fever produces a different type of disease in monkeys, guineapigs and white mice respectively.

No support is forthcoming for the view of KUCZYNSKI that the cause of yellow fever is the bacillus named *B. hepatodystrophicans*. The virus of yellow fever is still unknown; it is present in filtrable form in the blood of man and monkey, in the mosquito, in the guineapig and in the brain of the mouse.

The immunity developed by an attack of yellow fever is high and of long duration. HINDLE's work with virus vaccine is referred to as not yet being completely satisfactory. The question is raised by the authors whether a yellow fever virus, which is living but attenuated for man by passage through another species of animal, might not be the most serviceable for immunization. Comparison is made with the small pox virus, while the finding of new test animals is regarded as bringing the possibility nearer attainment. Experiments by the authors with infected mosquitoes which were kept for some days or weeks at a low temperature before being used to infect monkeys seemed to point to the development in these animals of an immunity without their having shown symptoms of illness. There is suggested in this experiment then the possibility of a mode of safe immunization with modified living virus. A third possibility of immunization through modified living virus is considered under the head of the immunity produced by an allied disease. Thus eleven rhesus monkeys which

had recovered from an infection with dengue virus were subjected to infection by a lethal yellow fever virus. Eight of these monkeys remained alive. This experiment is very suggestive of the immunity conferred by at least one allied disease [see above, p. 718].

W. F. Harvey.

DAVIS (Nelson C.). **The Transmission of Yellow Fever. On the Possibility of Immunity in *Stegomyia* Mosquitoes.**—*Amer. Jl. Trop. Med.* 1931. Jan. Vol. 11. No. 1. pp. 31–42. [3 refs.] [Yellow Fever Lab., Internat. Health Division, Rockefeller Foundation, Bahia, Brazil.]

In an attempt to discover whether yellow fever virus was persisting in the absence of recognized cases, monkeys were inoculated with the contents of *Aedes aegypti* caught in houses in Bahia. The results were negative. Experiments were then made on the possible influence of the ingestion of immune blood by mosquitoes. It was found that mosquitoes fed on immune blood, which had been digested, gave rise to no immunity when injected into or fed upon rhesus monkeys, and moreover became infective when subsequently fed on a yellow fever animal. In mosquitoes which had already digested a meal of infectious blood, the subsequent ingestion of immune blood had no influence on the development of infectivity. Two batches of mosquitoes fed on a mixture of virus and immune serum did not become infective, although the mixture itself produced yellow fever when inoculated into a monkey. [These results afford an independent confirmation of those previously recorded by the reviewer (*ante*, p. 285).]

E. H.

DAVIS (Nelson C.). Estudos sobre febre amarela. O effeito do calor e do frio sobre o desenvolvimento da infectividade nos *Aedes aegypti*. [**Studies on Yellow Fever. The Effects of Temperature on Infectivity of *Aedes aegypti*.**]—*Brasil-Medico*. 1931. Jan. 24. Vol. 45. No. 4. pp. 77–78. [2 refs.] [Yellow Fever Lab., Internat. Health Division, Rockefeller Foundation, Bahia, Brazil.]

The author here summarizes the results of a large number of experiments, details of which are to be published elsewhere [not stated]. The mosquitoes were kept in an atmosphere saturated with moisture, so that relative humidity would not affect the results. Immediately after feeding on an infected animal they were subjected to the temperature in question. The results are given as follows [translated]:

1. Mosquitoes kept for 2 days at 38° C., then for 2 days at 36° C. (i.e., 4 days at an average of 37° C.) and then allowed to bite a susceptible animal, set up fatal yellow fever.

2. After 5 days at 36° C., mosquitoes were infective. Two tests were made; one rhesus died, the other had a febrile attack, recovered, and was non-infectable afterwards.

3. After 6 days at 31° C. (with occasional drop to 30.5° C.) a fatal infection was caused.

4. After 8 days at room temperature (about 25° C.) they set up fatal infections.

5. After 30 days at 18° C. they were non-infective, but after another 6 days at the temperature of the laboratory, they became infective. HINDLE recorded infection after 20 days at 18° C. (this *Bulletin*, Vol. 28,

p. 285), but the author allowed 60 to bite after 20 days and 80 after 30 days at 18° C., with completely negative results. One monkey had slight fever, after a long interval, but not yellow fever, since its blood was non-infective and itself proved susceptible to inoculation of virus.

6. Mosquitoes kept at 8° C. for 28 days were not infective, but after 18 hours at room temperature and 6 days at 36° C., their bite caused fatal yellow fever.

7. Those kept at 36° C. for 5-7 days on biting set up fatal infection; after 20 days non-fatal infection, but the blood of this last caused fatal disease both by direct inoculation and indirect by mosquito.

8. Mosquitoes kept for 7 hours at 40° C. and then at room temperature were allowed to bite 17 and 28 days later, 50 or more at a time; non-fatal infection was caused. Thirteen mosquitoes belonging to the same lot, but which had not been subjected to the high temperature, set up rapidly fatal yellow fever after 28 days.

9. Six mosquitoes which survived exposure to 45° C. for 2 hours and were then kept at room temperature for 15 days, produced fatal infection in a rhesus at the end of this period.

10. The experiments showed that the virus in mosquitoes was not attenuated at temperatures down to 8° C., but prolonged exposures to high temperatures led to some degree of attenuation. Mosquitoes themselves are very susceptible to high temperatures and die before the virus which they harbour is destroyed.

H. H. S.

DAVIS (Nelson C.) & SHANNON (Raymond C.). **Studies on Yellow Fever in South America. Attempts to transmit the Virus with Certain Aedine and Sabethine Mosquitoes and with Triatomas (Hemiptera).**—*Amer. Jl. Trop. Med.* 1931. Jan. Vol. 11. No. 1. pp. 21-29. [6 refs.] [Yellow Fever Lab., Internat. Health Division, Rockefeller Foundation, Bahia, Brazil.]

These experiments extend the number of mosquitoes found capable of transmitting yellow fever under laboratory conditions. *Aedes fluviatilis*, a species which breeds in rock holes along stream beds, was found to be a fairly efficient carrier, as in 11 trials there were at least 8, and probably 9 infections. A fatal infection by bite was obtained with as few as three insects. *Aedes taeniorhynchus* breeds in pools near the sea coast. Although a much less efficient host than the former, in one case out of 10 experiments a fatal infection was produced by their bites, and also the virus survived in the bodies of this species as proved by injection. Eight experiments with Sabethine mosquitoes (*Wyeomyia* sp. and *Limatus*) gave negative results; in 7 instances the bodies of the mosquitoes were injected. A few inconclusive experiments were made with *Triatoma megista*; in one instance it was thought that the virus had remained alive in the bodies of these insects for one week. [The evidence, however, is not very convincing.]

E. H.

DAVIS (Nelson C.). **The Transmission of Yellow Fever. Further Experiments with Monkeys of the New World.**—*Amer. Jl. Trop. Med.* 1931. Mar. Vol. 11. No. 2. pp. 113-125. [7 refs.] [Yellow Fever Lab., Internat. Health Division, Rockefeller Foundation, Bahia, Brazil.]

The author gives the records of attempts to infect other species of Brazilian monkeys with yellow fever. A red howler monkey,

Alouatta seniculus, was infected by mosquito bites, and its blood was infective to rhesus monkeys by direct inoculation, and also to mosquitoes fed upon it during the access of fever. This monkey recovered and its serum was protective when tested in another animal. Two *Callicebus moloch* were inoculated; one developed immunity without showing any signs of disease, whilst the other had fever on the fifth day and its blood became infective. One owl monkey, *Aotus trivirgatus*, was bitten by infected mosquitoes; it showed no fever, but developed immune bodies in the blood. Three red-faced monkeys, *Cacajao rubicundus*, were found to be resistant; but the serum of one of them protected against virus both before and after the inoculation of infectious material. Two Saki monkeys, *Pithecia monacha*, were infected one with blood virus and the other with mosquito virus and the infection was transmitted back to *M. rhesus*. The serum of these recovered Saki monkeys showed very little protective value when subsequently tested. One *Cebus variegatus* was infected by mosquito bites and the virus recovered from its blood. Its convalescent serum was strongly protective. A spider monkey, *Ateles ater*, became infective on the 4th day after being inoculated with virus; 3 cc. of its convalescent serum failed to protect a test animal (rhesus). This spider monkey and one of the Sakis were reinoculated with virus; from neither of them was it possible to recover virus from the blood from the 4th day onwards.

E. H.

SNIJDERS (E. P.) & DINGER (J. E.). Die pathologisch-anatomische Diagnose des Gelbfiebers bei Affen. [**The Pathological-Anatomical Diagnosis of Yellow Fever in Monkeys.**]—Reprinted from *Virchows Arch. f. Path. Anat. u. Physiol.* 1931. Mar. 12. Vol. 280. No. 2. pp. 444-462. With 17 text figs. [17 refs.] [Colonial Inst., Amsterdam.]

The authors' account of the postmortem changes observed in a series of rhesus and cynomolgus monkeys infected with yellow fever, agree in general with those of other observers. Of especial interest is the section dealing with the histological changes with reference to the intranuclear inclusion bodies in the liver and their diagnostic value. Although they agree as to their importance, these bodies are not considered to indicate the presence of virus in the nuclei, but rather to be the result of specific degenerative changes produced in the course of the disease. Two monkeys killed by phosphorus poisoning did not show these bodies in the liver, although distinct necrosis as well as diffuse fatty degeneration was present.

Protection experiments were made in six monkeys with convalescent sera from six cases of five-day fever from the Dutch East Indies, to see if these sera contained any immune bodies against yellow fever. The results were uniformly negative.

E. H.

MAGALHAES (Aggeu de Godoy). **The Kidneys in Yellow Fever.**—*Arch. Pathology.* 1931. Apr. Vol. 11. No. 4. pp. 561-573. With 4 figs. (2 coloured). [17 refs.] [Path. Dept., Univ., Toronto.]

The author describes the changes in the kidney in yellow fever, based on the examination of 87 human cases and 34 monkeys. His

results agree in the main with previous observations but the following points are noteworthy: (1) fatty degeneration usually plays a minor part in the degenerative changes; (2) the calcareous casts contain iron; (3) some of the nuclei of degenerating cells contain acidophil homogeneous hyaline inclusions, sharply isolated in an empty clear space; (4) other nuclei show some form of degeneration as manifested by solidification into compact hyaline masses which subsequently break up into granules; these gradually fuse with the cytoplasm which in such cases is found to be undergoing hyaline and granular disintegration.

[The acidophil inclusions are evidently identical with those found in the kidneys of monkeys and wild rats by HINDLE and STEVENSON.*]

E. H.

MANTEUFEL (Paul) & HERZBERG (Kurt). Weitere Untersuchungen ueber die Bedeutung des *Bacillus hepatodystrophicans* (Kuczynski) für die Gelbfieberätiologie. III. Mitteilung. [Further Studies on the Significance of *B. hepatodystrophicans* in the Aetiology of Yellow Fever.]—*Klin. Woch.* 1931. Feb. 28. Vol. 10. No. 9. pp. 395-397. [6 refs.] [Hyg. Inst., Med. Acad., Düsseldorf.]

The present article contains further evidence as to the nature of this organism which the authors consider to be identical with *Bacterium renale* [see this *Bulletin*, Vol. 27, p. 877]. The organs of normal monkeys were found to contain this organism, as demonstrated by cultivation for 10 to 16 days of pieces of either liver or kidney from these animals in the special culture media used by Kuczynski. With one monkey 5 out of 50 pieces of liver gave positive results, and with another 2 out of 44. Using kidney 4 out of 20 were positive. Since this *Bacterium renale* has thus been cultivated from normal monkeys and is indistinguishable from *B. hepatodystrophicans*, the authors consider that this organism is not the cause of yellow fever, but merely a harmless commensal. *B. lymphophilus*, found by BLOOMFIELD and TORREY† in human lymph glands, is mentioned as a similar organism, as it occurs in normal individuals and has no obvious pathogenic effect.

It would seem that there is a group of similar micro-organisms that are able to grow anaerobically but find their optimum with an air pressure of 30-100 mm. of mercury. On passage, the cultures can be grown aerobically in Löffler's serum, but not on blood agar. [In view of the authors' results, combined with those of other workers, there can no longer be any doubt that the so-called *B. hepatodystrophicans*, described by KUCZYNSKI as the causative organism of yellow fever, is merely a harmless commensal.]

E. H.

HOFFMANN (W. H.) Fortschritte der Gelbfieberforschung.—Reprinted from *Zent. f. d. ges. Hygiene*. 1931. Vol. 23 No. 13/14. pp. 641-656. [37 refs.] [Finlay Inst., Havana, Cuba.]

RHO (Filippo). Nefriti e nefrosi e la caratteristica epatonefrosi della febb. e gialla.—*Ann. di Med. Nav. e Colon.* 1931. Mar.-Apr. Year 37. Vol. 1. No. 3-4. pp. 121-127. [2 refs.]

* *Transactions of the Royal Society of Tropical Medicine and Hygiene*, 1930, Vol. 23, p. 327.

† Torrey (1916)—*Jl. Med. Res.* Vol. 34, p. 65.

RELAPSING FEVER AND OTHER SPIROCHAETOSSES.

LEAGUE OF NATIONS MONTHLY EPIDEMIOLOGICAL REPORT. 1930. Dec. 15. Vol. 9. No. 12. pp. 481-490. With 1 map. [19 refs.]—**Relapsing Fever** (*Spirochaeta obermeieri*) [*S. recurrentis*] **from 1920 to 1930.** [In parallel French & English.]

An interesting review of the epidemiology of relapsing fever showing the remarkable diminution in the number of cases in Europe and North Africa during the past ten years. The persistence of endemic foci in both Italy and especially Russia, however, still constitutes a source of danger, for it is well known how rapidly this disease can assume epidemic proportions during wars and famines. Contrasting with this post-war decline in European countries, an extensive and deadly epidemic spread from Kouroussa, French Guinea, in 1921, throughout Equatorial Africa between 10° and 15° N., and the number of deaths caused during the first two years in the French Sudan and Niger was estimated at 80,000 to 100,000. Endemic foci still persist in all the savanna area south of the Sahara, where the inhabitants wear clothing and are infested with lice, but the disease does not occur among the naked tribes such as those of the equatorial forest.

Figures are also given of other epidemics, including those in Asia. It is shown that the fatality rate is generally higher in Africa than in Europe, and it is suggested that differences in the virulence of the causative agent of the disease in the various epidemics play an essential part, in addition to differences in the resistance of the population, determined by their physical well-being or conditions of nourishment.

E. Hindle.

RUSSELL (Helen). **Human and Experimental Relapsing Fever, Accra, Gold Coast, 1929-1930.**—*West African Med. J.* Lagos. 1931. Jan. Vol. 4. No. 3. pp. 59-66. With 6 folding charts.

The author has studied cases of relapsing fever occurring in the Gold Coast during 1929 and 1930. Attention is drawn to the difficulty of distinguishing relapsing fever in this colony from other diseases accompanied by toxic jaundice, when spirochaetes have disappeared from the blood. There is no single characteristic pathological lesion or group of lesions, but diagnosis has to be made largely by a process of exclusion. Spirochaetes may sometimes be found in lice collected from patients after the spirochaetes have disappeared from the blood. Spirochaetes from 41 cases of relapsing fever from three localities were typed with known sera, and found to be identical with those of the previous year. The pouched rat, *C. gambianus*, was the most satisfactory experimental animal for use in Accra. With this strain of relapsing fever the course of the disease was usually one attack and one relapse; occasionally a second relapse was observed. Spirochaetes were obtained from the seemingly negative blood between the original attack and relapse by subinoculation into normal rats; these "first interval" spirochaetes were of the relapse type. Alternation of the original attack type and relapse type spirochaetes occurred on passage from rat to rat. The types did not alternate in the same individual animal. Rats which had recovered from infection with one of the types remained resistant to reinfection with that type for months, but could be infected with any other type. Splenectomy before

infection increased the death rate to some extent but did not prevent the development of immunity; when performed after recovery it did not cause any reappearance of spirochaetes.

Spirochaetolysins specific to the type or types of spirochaetes with which the animal was infected, were found in the serum for months after infection, but in gradually waning strength.

E. H.

NICOLLE (Charles), ANDERSON (Charles) & LE CHUITON (F.). Sur l'existence, en Tunisie, de la fièvre récurrente espagnole. [**The Presence of Spanish Relapsing Fever in Tunis.**]—*C.R. Acad. Sci.* 1931. Jan. 26. Vol. 192. No. 4. pp. 194-196. [1 ref.]

—, — & —. Sur un cas de fièvre récurrente espagnole, observé en Tunisie.—*Arch. Inst. Pasteur de Tunis.* 1931. Apr. Vol. 20. No. 1. pp. 1-20. With 1 map & 2 charts in text. [Refs. in footnotes.]

Since *Ornithodoros erraticus* occurs in the Mediterranean region from Spain to Egypt, it was to be expected that the Spanish strain of relapsing fever, conveyed by this tick, would eventually be found in Algeria and Tunis. The present note contains a record of such a case in a patient who came from the neighbourhood of Bizerta. The pathogenicity of the strain was studied in laboratory animals and transmission experiments made with *O. erraticus* and *O. savignyi*. As usual, only the nymphs could transmit the infection by their bite, although both nymphs and adults became infected. The infection was not transmitted by lice. Evidence is adduced in support of the view that the smaller rodents, and not porcupines, may serve as the natural reservoir of the virus.

The second article contains full details of the various animal experiments and observations on this strain.

In an appendix it is mentioned that the number of strains of relapsing fever spirochaetes kept at the Pasteur Institute of Tunis has been reduced to four, viz. (1) *S. duttoni*, strain Ouzilleau from a human case; (2) *S. normandi*, from the burrows of small rodents at Kef; (3) *S. hispanica* of Mansouria, from *Ornithodoros* in the burrows of small rodents in Morocco; (4) *S. hispanica* from Sidi-Salem (human case). These four strains are generously placed at the disposal of any laboratory desiring to use them.

E. H.

NICOLLE (Charles) & ANDERSON (Charles). Rapport sur les spirochètes des fièvres récurrentes, transmises par les tiques. [**A Report on Relapsing Fever Spirochaetes transmitted by Ticks.**]—*Arch. Inst. Pasteur de Tunis.* 1930. Dec. Vol. 19. No. 4 pp. 469-477. [1 ref.]

A useful summary of the authors' main conclusions concerning this subject. Three distinct groups are recognized: (1) the uniform *duttoni* group, virulent to rats and mice, but having hardly any pathogenic action in guineapigs; (2) the *hispanica* group, equally pathogenic to guineapigs, rats and mice; (3) a group of spirochaetes found in small rodents, including *S. normandi*, *S. erratici*, *S. gondii*, hardly pathogenic to guineapigs and rats, but capable of infecting mice. In human beings these spirochaetes produce either a non-apparent infec-

tion (*S. normandi*) or none at all (*S. gondii*). It is pointed out that the *duttoni* group of spirochaetes is by far the most dangerous to man, and yet with few exceptions *S. duttoni* has been selected when relapsing fever has been used therapeutically for the treatment of general paralysis. The authors recommend the use of spirochaetes of the *hispanica* group, which produce an equally definite fever but are infinitely less dangerous.

E. H.

FRANCHINI (Giuseppe) & TADDIA (Leo). Febbre da puntura di zecche in Cirenaica causata dalla "*Ornithodoros Franchinii*" (n. sp.). [**Tick-Bite Fever in Cyrenaica caused by *Ornithodoros franchinii* (n. sp.)**].—*Arch. Ital. Sci. Med. Colon.* 1930. Aug. 1. Vol. 11. No. 8. pp. 453-458. With 1 text fig. English summary (7 lines).

In December, 1929, several patients, seen at Porto Bardia, reported that while tending sheep they were overtaken by a heavy fall of rain and took shelter in a small grotto where were many rats and ticks. The men were bitten by ticks and within 3 days or so they were seized with intense headache, high fever, vomiting and severe general malaise. Occasionally furuncles appeared and if the bite was on or near the scrotum a frequent complication was an epididymo-orchitis. Otherwise the symptoms cleared up in a week. The ticks were thought to be *O. lahorensis*, but Dr. TONELLI-RONDELLI, to whom specimens were sent, reported that they belonged to a new species which he named *O. franchinii*. [The points of distinction are not stated but the ticks are depicted in a photograph.]

H. H. S.

MEDULLA (Candido). La posizione della Cirenaica nella distribuzione della febbre ricorrente del Nord Africa. [**Cyrenaica and Relapsing Fever in Northern Africa**].—*Arch. Ital. Sci. Med. Colon.* 1931. Apr. 1. Vol. 12. No. 4. pp. 230-232. [1 ref.] English summary (6 lines). [Colonial Hosp., Benghazi.]

True relapsing fever appears to be rare in Cyrenaica, but there are other febrile conditions of a relapsing type which call for study. In Benghazi and the uplands in the late summer and early autumn cases are seen resembling some dengue, some pappataci fever, and others presenting up to three relapses at intervals of a few days. These have been, on inadequate grounds, diagnosed as relapsing fever, but careful examination of blood taken at all stages of the attack has failed to reveal the spirochaete and Barce is probably the only endemic centre of true relapsing fever.

H. H. S.

CHU (Fu-T'ang), DEITRICK (Sarah) & CHUNG (Shih-Fan). **Relapsing Fever in Children. A Study of Twenty-Six Epidemic Cases**.—*Nat. Med. J. China.* 1931. Apr. Vol. 17. No. 2. pp. 224-232. With 1 plate. [15 refs.] [Peiping Union Med. College, Peking.]

A study of 26 cases of relapsing fever in children in Peking. Although a widespread petechial rash was commonly present this may have been the result of the bites of insects, as these are a probable aetiological factor. The leucocyte count was of little value, varying between 4,100 and 19,600 in the febrile stage. Thrombocytopenia was constantly observed during the febrile attacks, the number of platelets

falling below 100,000, but after recovery the platelet count returned to normal or nearly normal, 200,000 to 300,000. No prolongation of the bleeding or coagulation time was noticed. The Wassermann reaction was negative in all except one case and the globulin precipitation test was negative in the 14 cases in which it was done. The icterus index fell within the range of 5 to 10 units in ten cases, this agreeing with the clinical observation of lack of jaundice or of hepatic enlargement in this series. The intravenous injection of 0.2 to 0.3 gm. of novarsenobenzol caused the disappearance of spirochaetes and of all febrile symptoms in less than 28 hours; all the patients recovered.

E. H.

MENK (W.). Ueber die chemotherapeutische Wirkung von Goldverbindungen bei der mit der *Spirochaeta crocidurae* infizierten Maus, unter besonderer Berücksichtigung der Behandlung mit Neosalvarsan-Solganalgemischen. [**The Chemotherapeutic Action of Gold Compounds in Mice infected with *S. crocidurae* [= *duttoni*], especially Treatment with Mixtures of Neosalvarsan and Solganal.**]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1931. Feb. Vol. 35. No. 2. pp. 97–107. [40 refs.] [Reich Health Office, Berlin-Dahlem.]

The author has tested the therapeutic action of a number of compounds on mice infected with the Senegal strain of *S. duttoni*, often called *S. crocidurae*. The blood of the mice was examined for spirochaetes during three weeks after the treatment and finally in most cases the infectivity of the brain was tested by subinoculation into other animals. The results show that a mixture of neosalvarsan and solganal gives a considerable increase in therapeutic efficiency without increasing the toxicity. A single injection of a mixture of $\frac{1}{3}$ to $\frac{1}{4}$ the dosis tolerata of solganal and about $\frac{1}{3}$ the dosis tolerata of neosalvarsan regularly cured mice, and even when these doses were reduced to $\frac{1}{16}$ and $\frac{1}{8}$, respectively, the majority were cured. Consequently this mixture is recommended for the treatment of human spirochaetal infections, including syphilis.

E. H.

BASKIN (M. M.). Die Heilwirkung des Triphals bei Infektion mit verschiedenen Stämmen der Recurrensspirochäte. [**The Therapeutic Action of "Triphal" on Various Strains of Relapsing Fever Spirochaetes.**]—*Klin. Woch.* 1931. May 9. Vol. 10. No. 19. pp. 886–888. [5 refs.] [Microbiol. Research Inst., Education Commissariat R.S.F.S.R., Moscow.]

The author tested the action of triphal, a gold compound, on mice infected with *S. recurrentis* and four strains of *S. duttoni*, respectively. The results indicate that triphal is a slightly more efficient drug than salvarsan, since although there was no marked difference in the respective effects on the parasites in the blood, those treated with the former showed a smaller percentage of persistent brain infections than those treated with salvarsan, the respective figures being 5.1 and 16.4.

Experiments showed that this gold preparation acts through the reticulo-endothelial system, for the injection of colloidal iron or splenectomy prevented the development of its full therapeutic action.

E. H.

KAWAMURA (H.). Experimentelle Untersuchungen ueber Misch- und Sekundärinfektion. I. Ueber den Einfluss einer experimentellen Rekurrensinfektion auf eine Infektion mit andersartigen Rekurrensspirochäten oder mit Trypanosomen. [**Experimental Studies on Mixed and Secondary Infections. I. Influence of Experimental Relapsing Fever on Infection with Another Type of Relapsing Fever or with Trypanosomes.**]—*Zent. f. Bakt.* I. Abt. Orig. 1931. Feb. 23. Vol. 120. No. 1/2. pp. 59–78. [91 refs.] [Reich Health Office, Berlin-Dahlem.]

The possibility of one infection influencing another in the same host is discussed in a lengthy introduction and then the author describes various experiments on this problem. Mice were inoculated with a strain of *S. duttoni* var. *crociduræ* and 24 or 48 hours later with a strain of *S. hispanica*, or conversely, first with *S. hispanica* and later with the *crociduræ* strain; other mice were inoculated with the two strains simultaneously. The results show that although the mixed infections persisted longer in the blood of the mice than either of the infections alone, there was no very definite evidence of the respective virulence of the strains being affected, although there was distinct evidence of the attacks being delayed. Both strains of spirochaetes were recovered from the brains of mice after the parasites had disappeared from the circulation.

In another series of experiments mice were infected with strains of *S. hispanica* and *Trypanosoma brucei* or *S. crociduræ* and *T. brucei*, either simultaneously, or the spirochaetes first, followed at intervals of 1 to 9 days by the trypanosomes. The results show that mice infected with this strain of *T. brucei* and two days later with *S. hispanica* died in four days, but when the trypanosomes were inoculated simultaneously the animal did not die until the 22nd day. Intermediate durations were obtained when the trypanosomes were inoculated after the spirochaetes. If the spirochaetes were removed from the circulation by a dose of 1/150 gm. solganal, the trypanosomes rapidly multiplied and killed the mouse within 6 or 7 days, whilst untreated mice with similar mixed infections survived 24 and 25 days respectively. When mice had previously been "blockaded," or splenectomized, the spirochaetes had the same effect on the trypanosomes. According to the author the spirochaete acts by strengthening the natural resistance of the organism against the trypanosome infection, as shown by the development of various relapse strains of trypanosomes in the mice with mixed infections. It is considered possible that in the treatment of paralysis, etc., by the use of acute infections, these act by stimulating the natural protective mechanism of the body.

E. H.

VELU (H.), BALOZET (L.) & ZOTTNER (G.). Infections mixtes trypano-spirochéliennes (*Trypanosoma maroccanum* + *Spirochaeta hispanicum*). [**Mixed Infections of *Trypanosoma maroccanum* and *Spirochaeta hispanica*.**]—*C.R. Soc. Biol.* 1931. Apr. 24. Vol. 106. No. 12. pp. 1092–1094. [8 refs.]

Guineapigs that had recovered from infection with this spirochaete were subsequently inoculated with *Trypanosoma maroccanum*; in one animal the spirochaetes did not reappear, but in another that had also been splenectomized, the spirochaetes reappeared in the blood 154

days after the original inoculation and 49 days after the inoculation of trypanosomes. When the two were inoculated simultaneously the spirochaetes had no effect on the development of the trypanosome infection, and vice versa, the trypanosome did not noticeably affect the spirochaetes, although there may have been fewer and shorter relapses [see above].

E. H.

DUBOIS (A.). Pluralité des souches chez *Spirochaeta duttoni*. [**Plurality of Strains in *S. duttoni*.**]—*C.R. Soc. Biol.* 1931. May 1. Vol. 106. No. 13. pp. 1294–1297. [3 refs.] [School of Trop. Med., Brussels.]

The author has compared two strains of *S. duttoni* from the Congo, both obtained from infected *Ornithodoros*. One of these strains, known as Kitega, came from the lake region, and the other—Kwango—has been kept in the laboratory for years. The Kitega strain is hardly ever fatal to mice, but regularly produces a persistent brain infection, which is evidently a natural property and not confined to old laboratory strains. A comparison of these two strains by means of cross immunity experiments in mice showed that recovery from one strain did not protect against infection with the other strain.

E. H.

MATHIS (C.) & DURIEUX (C.). Entretien, au laboratoire, des souches de *Spirochaeta duttoni*. [**The Maintenance in the Laboratory of Strains of *S. duttoni*.**]—*Bull. Soc. Path. Exot.* 1931. Feb. 11. Vol. 24. No. 2. pp. 150–153. [Pasteur Inst., Dakar.]

In order to reduce the number of animal passages necessary for the maintenance of this strain in the laboratory, the authors recommend the inoculation of brain emulsions instead of blood. It is well known that the infection persists in the brain long after it has disappeared from the blood, and consequently instead of having to passage every 4 to 6 days, it is only necessary to do it every 3 or 4 weeks. The infection produced by the inoculation of brain suspensions is less intense and may not appear until the sixth day. However, at any time, by inoculating the blood from any of these milder cases into normal mice, intense and fatal infections are produced.

E. H.

SEMZOVA (O. M.). Ueber die Wirkung exogener Einflüsse auf den Neurotropismus der Rekurrenzspirochäten. II. Der Einfluss von Alkohol auf die Persistenz der Rekurrenzspirochäten im Gehirn weisser Mäuse. [**Action of External Influences on Neurotropism of Relapsing Fever Spirochaetes. II. Influence of Alcohol on Persistence of Relapsing Fever Spirochaetes in Brains of White Mice.**]—*Ztschr. f. Immunitätsf. u. Experim. Therap.* 1931. Vol. 70. No. 1/2. pp. 104–107. [7 refs.] [Microbiol. Research Inst., Education Commissariat R.S.F.S.R., Moscow.]

White mice which had been given 0.3 cc. of 15 per cent. alcohol *per os* daily for periods of two weeks, three weeks, and 45 days respectively, were

then injected with a strain of *S. duttoni*. They were subsequently examined for persistent brain infections 39 to 46 days later, as well as a series of control mice similarly infected. Out of 70 "alcoholic" mice, 26 showed brain infections, whilst out of 36 normal mice only 7 showed brain infections. Consequently alcohol seems to have doubled the chance of residual brain infections, the respective percentages being 37.1 and 19.4.

E. H.

VELU (H.), BALOZET (L.) & ZOTTNER (G.). Apparition de la virulence du cerveau chez les cobayes inoculés avec le spirochète hispano-marocain. [Development of Virulence in Brain of Guinea-pigs inoculated with Spirochaetes of Moroccan Relapsing Fever.]—*C.R. Soc. Biol.* 1931. Apr. 24. Vol. 106. No. 12. pp. 1089–1091. [3 refs.]

Guinea-pigs were inoculated with this strain of relapsing fever in order to determine whether the brain had any particular affinity for the spirochaetes, as determined by killing these inoculated animals at varying intervals after the injection and testing the infectivity of the brain. The results show that no matter what method of inoculation is employed, including intracerebral, the spleen becomes infective at least as quickly as the brain, and it would seem that the spirochaetes commonly persist in the brain because of the weakness of the defence mechanism in that part of the body.

E. H.

VELU (H.), BALOZET (L.) & ZOTTNER (G.). Influence de la splénectomie dans l'infection expérimentale par *Spirochaeta hispanicum*. [Influence of Splenectomy in Experimental Infections with *S. hispanica*.]—*C.R. Soc. Biol.* 1931. Apr. 16. Vol. 106. No. 11. pp. 890–892. [5 refs.]

—, — & —. Influence du blocage du système réticulo-endothélial dans l'infection expérimentale par *Spirochaeta hispanicum*. [Influence of blockading the Reticulo-Endothelial System in Experimental Infections with *S. hispanica*.]—*Ibid.* p. 892. [1 ref.]

Splenectomy practised either before or after infection with *S. hispanica* was found to have no effect on the course of the disease. Moreover it did not cause the reappearance of spirochaetes in animals that had recovered from infection. Blockage of the reticulo-endothelial system of guinea-pigs with latent brain infections also did not cause the spirochaetes to reappear in the circulation.

E. H.

DELANOË (P.). Le mérion, réservoir de virus du spirochète marocain, *Sp. hispanicum* var. *maroccanum* Nicolle et Anderson, 1928. [The Merion, Reservoir of Moroccan Spirochaete, *S. hispanica* var. *marocana*.]—*C.R. Acad. Sci.* 1931. Apr. 7. Vol. 192. No. 14. pp. 859–860.

A record of the examination of 21 *Meriones shawi* collected in the neighbourhood of Oulad Fredj. By means of inoculation into guinea-pigs 2 out of these 21 animals were found to be infected with the Moroccan strain of Spanish relapsing fever, so evidently they are capable of acting as reservoir for the virus, in addition to the fox and the porcupine.

E. H.

PAMPANA (Emilio J.). Note di tecnica nello studio delle spirochetosi. La spirochetosi sperimentale da *Treponema hispanicum* nella cavia. [**Examination of Blood for Spirochaetes. Experimental Spirochaetosis in Guinea-pigs.**—*Arch. Ital. Sci. Med. Colon.* 1931. May 1. Vol. 12. No. 5. pp. 257–263. [3 refs.] English summary (3 lines). [Hyg. Inst., Univ., Rome.]

To facilitate search for spirochaetes in the blood, the following solution is recommended :

Methylene blue (B extra) 2 gm. ; distilled water 100 cc. ; dissolve with gentle heat, shake, filter and add formalin 4 cc. and glacial acetic acid 10 cc. The blood is taken in a thick drop, dried rapidly by holding over the microscope lamp ; the stain is poured on and allowed to act for 10 minutes, then rapidly washed in running water, blotted and dried. Spirochaetes and nuclei of leucocytes stain blue and show out clearly amid unstained surroundings. The solution keeps for months and acts with old as well as fresh specimens, the high concentration of acetic acid giving complete dehaemoglobinization.

The second part of this communication describes a mode of maintaining *S. hispanica*, (used in place of malaria therapy) without the necessity of frequent inoculation of animals. The author finds that infections with this spirochaete are markedly neurotropic in the guinea-pig, the brain and cerebellum being still infective 14 months after the primary inoculation, and possibly longer. To ensure maintenance of a strain, the guinea-pig is killed by chloroform 6 months after being infected, the brain and cerebellum are removed aseptically, thoroughly and repeatedly washed with sterile physiological saline to remove as much as possible all blood and serum, and then emulsified in saline. To infect a fresh guinea-pig 1 cc. is injected subcutaneously or intraperitoneally. In 6–12 days spirochaetes will be found in the circulation, the length of the intervening period depending largely on the age of the brain emulsion.

H. H. S.

KRITSCHESKI (I. L.) & SINJUSCHINA (M. N.). Ueber die Natur der Immunität bei Rückfallfieber. XIII. Ueber die Wechselbeziehungen der humoralen und der phagozytären Abwehrapparate des Organismus bei Rückfallfieber. [**Nature of Immunity in Relapsing Fever. XIII. Changes in the Humoral and Phagocytic Protective Mechanism of the Body in Relapsing Fever.**—*Krankheitsforschung.* 1931. Apr. Vol. 9. No. 2. pp. 139–166. With 11 text figs. [Refs. in footnotes.] [Microbiol. Research Inst., Education Commissariat R.S.F.S.R., Moscow.]

The authors find that in animals infected with relapsing fever, lysis of the spirochaetes is by far the most important factor in the termination of the infection whilst phagocytosis is only observed very occasionally. But when immune animals are reinoculated either subcutaneously or intraperitoneally both antibodies and phagocytes take part in the destruction of the spirochaetes, granulocytes and monocytes very actively ingesting these organisms. This phagocytosis, however, is only observed in immune animals inoculated in this manner ; if such an animal is inoculated intravenously, the spirochaetes are destroyed by the action of lysins without the aid of phagocytosis.

E. H.

MARCHOUX (E.) & CHORINE (V.). Culture des spirochètes de la poule. [**The Culture of Fowl Spirochaetes.**—*C.R. Soc. Biol.* 1931. Apr. 24. Vol. 106. No. 12. pp. 1125-1128. [2 refs.]

The authors have made various experiments to determine the most satisfactory method of cultivating fowl spirochaetes and recommend the following medium :

- (1) Horse serum heated three times for 30 minutes at 57-58° C.
(or rabbit or bovine serum similarly heated 20 cc.) ... 10 cc.
- (2) Sterile physiological saline at 9 per 1,000 ... [100 cc.
- (3) Sterile 10 per cent. solution of Witte's or Chapoteaut's
peptone ... [2 cc.
- (4) A 2 per cent. solution of glycogen sterilized by filtration ... 5 cc.

This mixture should have a pH of 7.5 to 7.7 and is run into tubes containing slopes of coagulated egg albumen. The liquid is then covered with a layer of oil or vaseline 1 cm. in thickness. Cultures are grown at 37° C. and the primary cultures only succeed when rabbit serum is used in preparing the medium. After four or five passages the rabbit serum can be replaced by other sera, such as those of the horse, ox, or man.

E. H.

TOYODA (H.). **Relapsing Fever.**—*Nat. Med. Jl. China.* 1931. Apr. Vol. 17. No. 2. pp. 233-267. With 8 figs. on 2 plates & 1 text fig. [46 refs.]

A general review of the subject in which points of especial interest are the author's references to observations on Manchurian relapsing fever.

E. H.

VELU (H.), BALOZET (L.) & ZOTTNER (G.). Contribution à l'étude expérimentale de *Spirocheta hispanicum* (var. *marocanum*). [**Experimental Study of *S. hispanica* (var. *marocana*).**—*Arch. Inst. Pasteur de Tunis.* 1931. Apr. Vol. 20. No. 1. pp. 21-47. [37 refs.]

The detailed observations recorded in this paper confirm the results of previous observations concerning a variety of problems on the behaviour of this spirochaete in a large series of experimental animals.

E. H.

TIMPANO (P.). Casi di broncospirochetosi in Calabria. Note epidemiologiche e clinicodiagnostiche. [**Bronchial Spirochaetosis in Calabria.**—*Policlinico. Sez. Prat.* 1931. June 8. Vol. 38. No. 23. pp. 804-808. With 3 text figs. [23 refs.] [Diagnostic Inst., Reggio Calabria.]

The author states that he has observed four cases of bronchial spirochaetosis and gives the details of one.

H. H. S.

NEUDA (Paul). Gibt es eine Gestaltänderung bei Spirochäten?—*Wien. Klin. Woch.* 1931. May 1. Vol. 44. No. 18. pp. 578-579. [3 refs.]

LEPTOSPIROSIS.

TAYLOR (J.) & GOYLE (Amar Nath). **Leptospirosis in the Andamans (with an Appendix on the Present Knowledge of Leptospiral Infections).**—*Indian Med. Res. Memoirs. Supplementary Series to Indian Jl. Med. Res.* 1931. Mar. Memoir No. 20. pp. v+190. With 8 charts, 3 maps & 2 plates. [4 pages of refs.] [Pasteur Inst. of Burma, Rangoon.]

This memoir constitutes a valuable addition to our knowledge of this disease, but it is only possible to refer to the authors' main conclusions. The leptospiral nature of epidemic jaundice in the Andamans has been confirmed by the examination of 64 cases during 5 months, all of which gave a positive serological test or a positive blood culture. The cases varied from the mildest non-icteric type to severe fatal cases showing all the characteristics of Weil's disease. The mortality of this epidemic was 18·7 per cent. Blood culture was found to be the most reliable method of diagnosis and was usually positive during the first five or six days of the disease. Serological confirmation of the disease could often be obtained after the 15th day.

In the Andamans the disease is prevalent during the south-west monsoon and cases are practically confined to adult males engaged in outdoor occupations which involve working in water and mud for long periods. The infection is widely scattered and does not as a rule show any marked intensity in any one area, although there was one outbreak of 19 cases with 4 deaths, which occurred within 3 weeks in a gang employed in the construction of a bund in swampy ground. The onset of the first case was 6 days after the beginning of the work and the last case was 8 days after construction had stopped.

Samples of standing water from different localities showed variations in pH from 7·6 to below 6·6. *Leptospira* was found in most water samples showing a reaction of pH 6·9 or over and was absent from those below 6·9. Rats were found to be absent from the infected fields during the epidemic season of the monsoon. A small number obtained from certain areas showed no leptospira in their kidneys. The leptospira strains isolated belonged to two distinct serological types: 24 were distinct from any known type and have been called "Andamans A"; the remaining 4 were agglutinated by *Akiyami* A antisera, but in addition showed a specific agglutination with their own anti-serum.

The cultures of "Andamans A" group were of low pathogenicity for adult guineapigs but young ones (about 120 gm.) could be infected by intraperitoneal injections of 3 cc. of a rich culture. Virulence for guineapigs was increased by subsequent passages using liver emulsions and eventually adult guineapigs were infected. The other strains related to *Akiyami* A were not found to be pathogenic to young guineapigs.

The second part of the memoir contains a useful summary of the present knowledge of leptospiral infections.

E. Hindle.

PAWAN (J. L.). ***Leptospira ictero-haemorrhagiae* in Rats in Trinidad, B.W.I.**—*Ann. Trop. Med. & Parasit.* 1931. Mar. 31. Vol. 25. No. 1. pp. 31-33. [4 refs.]

This spirochaete was found in 32 out of 120 (26·6 per cent.) rats examined in Trinidad. All the strains, except two, were pathogenic

to guineapigs and were readily cultured. The incidence of the infection was highest in the older and heavier rats.

E. H.

- GARNIER (Marcel), NICAUD (P.) & MAISLER (A.). Spirochétose méningée pure à rechute.—*Bull. et Mém. Soc. Méd. Hôpit. de Paris*. 1931. May 25. Year 47. 3rd Ser. No. 17. pp. 869-875. [6 refs.]
- LAIGNEL-LAVASTINE (M.), BOQUIEN (Y.) & PUYMARTIN (Ch.). Spirochétose méningée anictérique.—*Bull. et Mém. Soc. Méd. Hôpit. de Paris*. 1931. May 25. Year 47. 3rd Ser. No. 17. pp. 802-806. [2 refs.]
- LOYGUE & LEMOINE. Ictère spirochétosique. Action probable "in vivo" de la gonacrine sur la virulence du spirochète.—*Bull. et Mém. Soc. Méd. Hôpit. de Paris*. 1931. Feb. 2. Year 47. 3rd Ser. No. 3. pp. 119-122. With 1 chart in text.
- O'CONNOR (M. H.). Spirochaetal Jaundice.—*Irish Jl. Med. Sci.* 1931. May. No. 65. pp. 214-221. [15 refs.]
- SLOT (J. A.). Myeloïede reactie en haemoglobinurie als verwickeling bij de ziekte van Weil.—*Geneesk. Tijdschr. v. Nederl.-Indië*. 1931. Jan. 1. Vol. 71. No. 1. pp. 48-51. With 1 chart in text.
- TARASSOFF (Serge). Note additionnelle sur l'agent infectieux de la schlamme fièvre ou leptospirosis grippo-typhosa aquatilis.—*Ann. Inst. Pasteur*. 1931. June. Vol. 46. No. 6. pp. 635-638.
- TOMITA (S.). Klinische Untersuchungen ueber die Liquor cerebrospinalis bei Spirochaetosis icterohaemorrhagica.—*Fukuoka-Ikwadaigaku-Zasshi (Fukuoka Acta Med.)*. 1930. Mar. Vol. 23. No. 3. [In Japanese. German summary pp. 21-22.] [1st Med. Clinic, Imperial Kyushu Univ., Fukuoka, Japan.]
- TOMITA (S.). Experimentelle Untersuchungen ueber den Liquor cerebrospinalis bei Spirochaetosis icterohaemorrhagica.—*Fukuoka-Ikwadaigaku-Zasshi (Fukuoka Acta Med.)*. 1930. Aug. Vol. 23. No. 8. [In Japanese. German summary pp. 67-68.] [1st Med. Clinic, Med. Faculty, Imperial Kyushu Univ., Fukuoka, Japan.]
- TOMITA (S.). Experimentelle Untersuchungen ueber die Durchlässigkeit der Meningen bei Spirochaetosis icterohämorrhagica.—*Fukuoka-Ikwadaigaku-Zasshi (Fukuoka Acta Med.)*. 1930. Sept. Vol. 23. No. 9. [In Japanese. German summary pp. 69-70.] [1st Med. Clinic, Imperial Kyushu Univ., Fukuoka, Japan.]

RABIES.

A REVIEW OF RECENT ARTICLES. XV.*

i. *Virus.*

REMLINGER and BAILLY,^{1, 2} in a most interesting communication, describe and discuss the confusion which has arisen on various occasions between the rabies virus and other neurotropic viruses. The evidence on either side is given in illuminating detail in each instance and cannot be condensed in a review. They conclude (1) that the virus of KORITSCHONER (*Wien. Klin. Woch.*, 1923, p. 385) was a slightly modified rabies virus. (2) That the encephalytic virus of KOBAYASHI was, as shown by COWDRY's experiments (this *Bulletin*, Vol. 24, p. 762), without doubt a rabies virus. (3) That the herpetic virus DK of NICOLAU and KOPCIOWSKA (this *Bulletin*, Vol. 27, p. 251) was of the same category. (4) The identity of the virus ECK (SILBERSTEIN) remains in suspense. Of the animal viruses: (1) that of the state of Santa Catherina (CARINI: *Annales de l'Institut Pasteur*, 1911, pp. 843-846) which caused an epidemic amongst cattle, horses and mules, but, curiously, was not transmitted to man or dogs, was not a rabies virus: the symptoms were those of a pseudo-bulbar paralysis, or "maladie d'Aujesky." (2) The same appeared to be the case in the endemic in the state of Rio Grande do Sul. On the other hand (3) the acute contagious encephalitis of cattle (DONATIEN and BOSSELUT, *Rev. Gen. de Med. vet.*, 1922, pp. 185-191) was really rabies, as also was (4) the meningo-myelitis of young dogs (REMLINGER and BAILLY). The authors discuss the means by which such confusion may be avoided. The presence of Negri bodies cannot be depended upon, as inclusion bodies are a common feature of virus diseases on the one hand, and on the other they may not be found in rabies. Experimental inoculation is of great importance especially if a series of passages is made. The resistance of the virus to anti-sera may be tested and finally the method of crossed immunity may be employed. The authors draw attention to the recommendation of the International Conference on Rabies (Paris, 1927) that researches should be carried out on the plurality of street and fixed virus, and state that there has as yet been no response to this suggestion.

A comparative examination of the characteristics of the fixed viruses of Sassari and Odessa has been made by PALAWANDOW and SEREBRENNAJA.³ They believe that for purposes of comparison it is sufficient to determine the minimum lethal dose by subdural inoculation, and by subcutaneous injection. Other characteristics such as resistance to drying, to glycerine, to phenol, etc., they believe to be

* For the fourteenth of this series see Vol. 28, pp. 243-257.

¹ REMLINGER (P.) & BAILLY (J.). Les confusions entre les virus neurotropes et le virus rabique. Moyens de les éviter.—*Bull. Acad. Méd.* 1930. Dec. 30. Year 94. 3rd Ser. Vol. 104. No. 42. pp. 771-785. [17 refs.] [Pasteur Inst., Tangiers.]

² REMLINGER (P.) & BAILLY (J.). Les confusions entre les virus neurotropes et le virus rabique. Moyens de les éviter.—*Bull. Inst. Pasteur.* 1931. Jan. 15. Vol. 29. No. 1. pp. 1-13. [20 refs.] [Pasteur Inst., Tangiers.]

³ PALAWANDOW (Haidar) & SEREBRENNAJA (A. I.). Beitrag zum Vergleich biologischer Eigenschaften der Stämme des Virus fixe Sassari mit dem Odessaer Virus fixe.—*Ztschr. f. Immunitätsf. u. Experim. Therap.* 1930. Vol. 69. No. 3/4. pp. 267-276. [19 refs.] [Bact. Inst., Odessa.]

secondary, and dependent on these two primary factors. Parallel tests, carried out on 157 rabbits with the Odessa virus, and 227 with the Sassari virus showed that the Odessa was somewhat stronger. The minimal lethal doses were 0·000008 gm. (Odessa) and 0·000025 gm. (Sassari). By subcutaneous injection of rabbits it appeared that the Odessa virus was virulent in a dose of 0·05 gm. (12½ per cent. mortality), whilst the Sassari killed in a dose of only 0·5 gm. (1 per cent. mortality).

REMLINGER (*Ann. de l'Inst. Pasteur*, 1918, p. 406) drew attention to the rare presence of rabies virus in the spleens of rabid guineapigs (8 times in 42 cases). REMLINGER and BAILLY⁴ have repeated these experiments in other animals. The following are the results: In the rabbit, 3 positive in 16 tests; in the cat, 7 positive in 15 tests; in the dog, 2 positive in 7 tests; in the rat none positive in 5 tests. Thus in 12 out of a total of 43 tests (28 per cent.) a positive result was obtained. The authors believe that this result is explained by the work of MANOUÉLIAN and VIALA (this *Bulletin*, Vol. 25, p. 707), who showed that the virus in salivary and other glands is present in the neurones of the ganglia. The achievement of a positive result is thus due to the chance inclusion of neurones containing parasites. An argument in favour of this opinion is that in the case of the cat in which the peripheral nervous system is exceptionally developed, the percentage of successes was higher than in the dog and in the rabbit.

In a second paper REMLINGER and BAILLY⁵ show that the livers of various animals dead of rabies, may contain rabies virus. The results were as follows: of 9 cats 5 were positive. Of 6 rabbits one was positive. Of 4 rats and one dog none were positive. In these experiments various strains of virus were used. The kidneys were also examined. In the case of the cats 5 were positive, of the 6 rabbits one was positive, of 2 dogs, 2 rats and one guineapig none were positive. Again the largest proportion of successes related to the cat.

CURASSON and DISCHAMPS⁶ have succeeded in passaging the virus used by DABBADIE (this *Bulletin*, Vol. 28, p. 243), through eleven generations (using the cynocephalus as test animal), without any alteration in virulence. As the virus in question was undoubtedly autochthonous, these experiments afford a further argument in favour of the identity of the virus of French West Africa with that of rabies. The authors recommend the use of the cynocephalus as an experimental animal as it is easy to procure in these regions.

The evidence regarding the occurrence of rabies in South Africa is presented, in a concise but exhaustive review by DU TOIT.⁷ As the matter is of great interest his summary may be quoted verbatim.

"In 1892 rabies was introduced into South Africa [by an Airedale terrier which had been imported] and spread in and around Port Elizabeth.

⁴ REMLINGER (P.) & BAILLY (J.). Présence du virus rabique dans la rate.—*C.R. Soc. Biol.* 1931. May 1. Vol. 106. No. 13. pp. 1204-1205. [1 ref.] [Pasteur Inst. of Morocco, Tangiers.]

⁵ REMLINGER (P.) & BAILLY (J.). Présence du virus rabique dans le foie et dans le rein.—*C.R. Soc. Biol.* 1931. May 22. Vol. 107. No. 16. pp. 201-202. [1 ref.] [Pasteur Inst. of Morocco, Tangiers.]

⁶ CURASSON (G.) & DISCHAMPS (A.). Au sujet de l'unicité de la rage en Afrique Occidentale Française.—*Bull. Soc. Path. Exot.* 1931. Feb. 11. Vol. 24. No. 2. pp. 154-155. [1 ref.]

⁷ DU TOIT (P. J.). Rabies in South Africa.—*Pan-African Agric. & Vet. Conference, Pretoria, 1-17 Aug. 1929. (Papers Vet. Sect.).* pp. 272-284. [15 refs.]

It was eradicated in less than a year, and, since then, until quite recently, the Union of South Africa was considered free of the disease. Southern Rhodesia was infected with rabies from 1902 to 1913, but no cases have been recorded since the latter year. Since 1916 a number of cases have been observed in human beings in the Union of South Africa, which, clinically, appeared to be typical rabies. In none of these cases could the diagnosis be confirmed by microscopical examination or biological tests. In November, 1928, two further cases occurred in boys who had been bitten by a yellow mongoose ('rooi meerkat,' *Cynictus penicillata*). The diagnosis of rabies was confirmed by an examination of the brains of the boys. Rabies was also diagnosed in yellow mongoose caught on the veld, and which appeared to be sick. Cases are recorded of a dog and an ox which contracted rabies, apparently as the result of being bitten by infected yellow mongoose. Rabies has further been diagnosed in a genet cat ('Muskejaatkat,' *Genetta felina*); and cases are recorded of human beings becoming infected with rabies after being bitten (or scratched) by this animal. There is no evidence at present to show that other wild animals in South Africa, besides the two mentioned, harbour the rabies infection. The infected area appears to stretch from the eastern Transvaal to Bechuanaland (Vryburg) in the west and the northern Cape (De Aar) in the south. The area probably embraces the whole of the Orange Free State.

"The most remarkable feature about the disease in South Africa is the fact that it has not spread among the dog population. The question arises whether we are dealing with true rabies or not. Points in favour of the view that it is true rabies are:—(a) The susceptibility of human beings, dogs and laboratory animals. (b) The symptoms observed in these. (c) The presence of typical Negri bodies in the brain. Points against the view that it is true rabies are:—(a) The fact that in nature it has been confined to wild carnivores (of the family *Viverridae*). (b) That it has shown no tendency to spread among the dogs. Apparently the infection has become somewhat modified during its sojourn in the wild carnivores.

"The origin of the present infection is unknown, neither is it certain how long the disease has been present in South Africa. Certain facts seem to indicate that the infection is of comparatively recent origin and that it is spreading. The control of the disease in South Africa presents unusual difficulties. The eradication of the yellow mongoose and the genet cat is practically impossible. Their numbers should, however, be reduced. In the infected areas the number of dogs should also be restricted and all ownerless dogs destroyed. In view of the comparatively dormant state of the disease in South Africa, it is desirable to continue to prohibit the importation of dogs from countries where rabies exists."

ii. Symptomatology.

v. LÖT⁸ describes a case of recurrent rabies in a rabbit, which in the course of a passage experiment had been inoculated with the brain of a rabbit which died of typical rabies on the 7th day. No symptoms other than recurrent rises of temperature were observed, and these continued up to the 106th day. From the 106th to the 206th day there was no rise of temperature. An operation was performed on two occasions entailing the excision of a small portion of brain substance, and as a result of the second operation the rabbit died. Its brain was examined, and small Negri bodies were found. A rabbit inoculated with the portion of brain excised on the 48th day died

⁸ v. LÖT (Josef). Ueber einen Fall von rückfallender Tollwut (*Lyssa recurrens*) bei Kaninchen.—*Zent. f. Bakt. I. Abt. Orig.* 1931. Feb. 23. Vol. 120. No. 1/2. pp. 86-89. [1 ref.] [General Path. & Therap. Inst., Franz Joseph Univ., Szegedin.]

on the 18th day of typical rabies. Another inoculated with brain excised on the 206th day died 114 days afterwards with typical rabies, i.e., after a protracted incubation. A rabbit inoculated with brain substance taken after death died of typical rabies after 140 days. From these observations the author considers that in this case there was evidence of a definite tendency towards cure.

TORPY⁹ describes the symptoms and course of a case of hydrophobia.

iii. *Diagnosis.*

In a previous review (this *Bulletin*, Vol. 27, p. 254), reference was made to the view of KOCH (Jos.) that the distribution of rabies virus in the brain was uneven, and that for diagnostic purposes various parts of the brain should be examined. REMLINGER and BAILLY¹⁰ have submitted this to the test. From 10 animals 63 samples of nervous material were taken at different levels of the brain and cord. Emulsions of these samples were inoculated into 63 rabbits, 57 of which developed rabies. KOCH's statement is thus substantiated, though the chance of non-success is small. The authors suggest that from the practical point of view instead of subinoculations from various samples, it would be simpler to make up a larger quantity of emulsion from a large volume of brain, and to use a sample of the mixture.

THOMAS and JACKSON¹¹ emphasize the importance of searching for Negri bodies in the *nucleus oculomotorius*. Figures are given relating to 70 rabbits' brains examined in South Africa. (The authors admit the remote and unlikely possibility that the South African strain of rabies may differ from that of other countries.) Of the 70, 49 were clinically positive, and 48 were positive histologically. In 25 cases (51 per cent.) Negri bodies were more frequent in the mid brain than in the hippocampus. In only 1 (2 per cent.) were they more frequent in the latter than in the former. In 11 cases (22 per cent.) Negri bodies were absent in the hippocampus but present in the mid brain, and in 1 case (2 per cent.) they were absent in the mid brain, but present in the hippocampus.

"The best level at which to cut the mid brain section appears to be at the anterior extremity of the posterior *corpora quadrigemina*. At this point the *nucleus ruber* lies in the most dorsal part of the *formatio reticularis*, immediately below and against the *nucleus oculomotorius*." The authors believe that by this method the proportion of incorrect diagnoses may be materially decreased, and are of opinion that the labour and time spent in routine examination are greatly reduced. "The oculomotor nucleus is easily found, and its whole extent may be covered rapidly owing to its restricted size. All that is necessary is to focus the small group of ganglion cells lying immediately below and on either side of the aqueduct (especially those in the neighbourhood of the small blood vessels which will be

⁹ TORPY (C. D.). A Case of Hydrophobia.—*Indian Med. Gaz.* 1930. Dec. Vol. 65. No. 12. p. 700.

¹⁰ REMLINGER (P.) & BAILLY (J.). Sur l'existence de régions avirulentes dans le système nerveux central de chiens morts de rage.—*C.R. Soc. Biol.* 1931. May 1. Vol. 106. No. 13. pp. 1201-1203. [1 ref.] [Pasteur Inst. of Morocco, Tangiers.]

¹¹ THOMAS (A. D.) & JACKSON (Cecil). The Value of the Midbrain in the Diagnosis of Rabies in Rabbits.—*Jl. South African Vet. Med. Assoc.* 1930. Oct. Vol. 1. No. 4. pp. 67-73. With 1 text fig. [2 refs.]

seen transected in this region), when, in the great majority of positive cases, Negri bodies will be found immediately." When Negri bodies are rare a wider search may be made. Tissues were embedded in paraffin, and sections stained by methyl blue and eosin. The reviewer would invite those who have access to the necessary material to put these statements to the test and to publish their findings as the matter is of considerable importance.

It will be remembered that LENCI and ESQUIVEL reported that in paralytic rabies in dogs the spleen is hypertrophied, and shows sub-capsular haemorrhages, and as a result considered an increase of about four grams per kilo. in the weight of the spleen to be of diagnostic value (this *Bulletin*, Vol. 26, p. 220). D'AUNOY and BEVEN¹² have examined the spleens both grossly and microscopically of 100 rabid and 50 non-rabid dogs and have failed to find any evidence of splenomegaly or of microscopic splenic change which might be considered as pathognomonic.

As the result of his experience in the Italian province of Lecce, CANDIDO¹³ emphasizes the importance of the Negri body in the diagnosis of rabies, and the advantage of carbolized vaccines in its treatment.

iv. Pathology.

It will be remembered (this *Bulletin*, Vol. 26, p. 222) that REMLINGER and BAILLY failed to demonstrate the least trace of immunity as a result of the treatment of 19 rabbits with desiccated vaccine, and of 17 with ether vaccine, by intracerebral inoculation, whereas MARIE and MUTERMILCH (this *Bulletin*, Vol. 25, p. 709) were able to immunize by the intrameningeal route. LÖFFLER and SCHWEINBURG¹⁴ from an extended series of experiments confirm the former results. They were unable to develop any degree of immunity by intracerebral inoculation. They agree with REMLINGER and BAILLY that intracerebral inoculation differs fundamentally from intrameningeal inoculation, and draw the conclusion that the antibodies to rabies virus, which come into action in the brain after successful intramuscular, subcutaneous, or intra-peritoneal immunization, are not formed in the brain itself but in other organs. This view is opposed to that of LUBINSKI and PRAUSNITZ, who with reference to QUAST's experiment came to the conclusion that the antibodies were produced by the cells of the central nervous system.

Following on previous work (this *Bulletin*, Vol. 26, p. 224), REMLINGER, PALMOWITCH and BAILLY¹⁵ have again failed to substantiate the observation of QUAST that fixed virus passes into the central

¹² D'AUNOY (Rigney) & BEVEN (J. L.). The So-called Splenic Lesions in Canine Rabies.—*Jl. Infect. Dis.* 1931. Mar. Vol. 48. No. 3. pp. 335-336. [1 ref.] [Charity Hosp., & College of Med., Louisiana State Univ., New Orleans.]

¹³ CANDIDO (G.). Sulla diagnostica della rabbia.—*Riforma Med.* 1931. Mar 23. Vol. 47. No. 12. pp. 464, 467.

¹⁴ LÖFFLER (Ernst) & SCHWEINBURG (Fritz). Zur Theorie der Immunität bei Lyssa.—*Virchows Arch. f. Path. Anat.* 1930. Nov. 10. Vol. 279. No. 1. pp. 181-192. [10 refs.]

¹⁵ REMLINGER (P.), PALMOWITCH (S. M.) & BAILLY (J.). Nouveaux faits démontrant que le virus fixe ne passe pas dans le système nerveux central au cours du traitement antirabique.—*C R. Soc. Biol.* 1931. May 22. Vol. 107. No. 16. pp. 203-204. [3 refs.] [Fasteur Inst. of Morocco, Tangiers.]

nervous system during the course of treatment. During the course of studies on antirabic serum, tests were carried out on a number of animals which had received very large doses of virus. The animals were killed and their brains examined for fixed virus. In every case the result was negative. Further experiments were carried out on 4 dogs and 4 rabbits, each of which had received a full treatment identical with that administered to the most severe human case. Again the results were negative.

It is well known that the blood is not infective in the large majority of cases of rabies, though positive results have been reported from time to time. MARIE and URBAIN¹⁶ have carried out some experiments to find whether the passage of the virus into the blood stream may be facilitated by the administration of various substances which provoke the phenomenon of shock—such as neutral “farine lactée Nestlé,” tuberculin, and gonacrine (trypaflavine). The appropriate injection was made into the subarachnoid space, or into the veins of rabbits which had been previously infected with fixed virus, and the blood was tested for virulence by intracerebral injection into rabbits or guineapigs. The most favourable time for administration appeared to be from four to six days after the rabbit had been infected.

In the case of three animals to which “farine lactée” had been administered the blood proved to be infective. In 4 of 11 animals treated with crude tuberculin, a positive result was obtained. A similar result was obtained in 1 out of 3 animals treated with gonacrine. Iodide of potassium and cholesterin were also tested, for other reasons, but apparently they had no action. To summarize: In the case of 32 animals treated by the first three substances, 8 typically positive results were obtained, i.e., 25 per cent. In the case of 7 other test animals from this series symptoms of consumptive rabies occurred.

It is also well known that intravenous injection of passage virus does not lead to infection. Thus failure has been ascribed by many writers to viricidal properties of the serum, etc. JOWELEW¹⁷ has found that by breaking down the haemato-encephalic barrier by pumping, in animals which have received an intravenous dose of fixed virus, the virus finds its way into the brain, and the animal dies of rabies. Simple extraction of the cerebro-spinal fluid is not sufficient.

GLUSMAN and SOLOWJEW¹⁸ submitted the sera of 70 patients who had been immunized by the Högyes-Philipps method, three weeks after the end of treatment, to serological tests, with the object of determining whether a quantitative relationship exists between the presence of antibodies, and the degree of immunity. The titre of antirabic antibodies, as tested by observing the virulence of mixtures of sera and brain emulsion on inoculated rabbits, was not high, and was sometimes so low that it could not be determined. It was not related to the degree of immunity which had been attained.

¹⁶ MARIE (A. C.) & URBAIN (Ach.). Virus rabique fixe et virulence du sang.—*C.R. Soc. Biol.* 1931. Jan. 30. Vol. 106. No. 3. pp. 166-168. [1 ref.]

¹⁷ JOWELEW (B. M.). Ueber einige Bedingungen der Impfung mit Tollwut aus dem Blute.—*Ztschr. f. d. gesamte Experim. Med.* 1930. Nov. 5. Vol. 74. Nos. 1-2. pp. 217-223. [15 refs.] [White Russian Microbiol. Inst., Minsk.]

¹⁸ GLUSMAN (M. P.) & SOLOWJEW (J. W.). Zur Frage der Bedeutung der Virulicidie des Serums für die Beurteilung des Vorhandenseins einer antirabischen Immunität.—*Ztschr. f. Hyg. u. Infektionskr.* 1931. Jan. 15. Vol. 112. No. 1. pp. 40-45. [8 refs.] [Metschnikof Sanit. Bact. Inst., Kharkov.]

v. *Methods of Treatment and Statistics.*

In 1908 REMLINGER showed as the result of experiment that nervous substance does not belong to the category of substances which provoke anaphylactic phenomena. REMLINGER and BAILLY¹⁹ cite in this communication the cases of three individuals, the first of whom had received antirabic treatment by Calmette's method four times during the course of four years, the second three times in four years, and the third two treatments with 17 years' interval. In none of these were any anaphylactic sequelae observed. The repetition of pasteurian treatment may be thus entered upon without anxiety.

The use of herbivora as a source of fixed virus has frequently been referred to in these reviews (this *Bulletin*, Vol. 28, pp. 249-250, etc.). KERBLER²⁰ from observations on the sheep finds that fixed virus from this animal is as good as that from the rabbit.

Since 1925 the antirabic treatment employed at the Institut Camara Pestana (Lisbon) has been that of killed phenol vaccine. The vaccine contains 5 per cent. of nerve substance, in 1 per cent. phenol heated at 37° C. for 24 hours. The dose is 5 cc., and the duration of treatment is 40 days for severe cases, 30 for medium, 20 for slightly bitten persons, and 15 where the skin has not been broken. The sera of the vaccinated has been tested for the presence of rabicidal substances by DA SILVA²¹ in a number of cases. The results are compared with those obtained by the author after treatment by ether vaccines (this *Bulletin*, Vol. 24, p. 229). It appears that if the presence of rabicidal substances is taken as a criterion of efficacy, then ether vaccine confers a more rapid and a more solid immunity than does vaccine killed by phenol, and consequently should be preferred. The ether vaccine has, however, in the author's series of cases, led to one fatal case of myelitis, and has in general caused pain and inconvenience to the patient. As killed phenol vaccines in the dosage employed are inoffensive, easily prepared and administered, and can be sent to outcentres, their employment from the practical point of view is fully justified.

In September, 1928, KELSER published a preliminary note on the use of chloroform-treated vaccine for antirabic inoculation (Vet. Bul., Vet. Corps, Med. Dept., U.S. Army, 1928, xxii, 3). The vaccine was tested by SCHOENING (this *Bulletin*, Vol. 27, p. 754), who found that its potency was greater than that of formolized and phenolized preparations, and suggested that this might be due to the fact that the chloroform vaccine contained 1.6 gm. of nerve substance whilst the phenol vaccine contained only 0.5 gm. A further report is now presented by KELSER.²² The chloroform content of the vaccine, which contains 33½ per cent. of brain substance, has now been increased from 0.75 to 1 per cent. In order to be certain that the vaccine has been killed

¹⁹ REMLINGER (P.) & BAILLY (J.). Innocuité des répétitions du traitement antirabique chez l'homme.—*C.R. Soc. Biol.* 1931. Feb. 27. Vol. 106. No. 7. pp. 523-524. [1 ref.] [Pasteur Inst. of Morocco, Tangiers.]

²⁰ KERBLER (Ferdinand). Ueber die Gewinnung von Virus fixe aus Schafen.—*Zent. f. Bakt. I. Abt. Orig.* 1931. Feb. 3. Vol. 119. No. 7 8. pp. 427-430. With 4 text figs. [Vet. High School, Budapest.]

²¹ DA SILVA (E. Pereira). Substances rabicides dans le sang des individus vaccinés au virus fixe phéniqué mort.—*Arquivos Inst. Bact. Camara Pestana.* 1930. Vol. 6. No. 2. pp. 138-166. [13 refs.] [Camara Pestana Inst., Lisbon.]

²² KELSER (R. A.). Chloroform-treated Rabies Vaccine.—*Jl. Amer. Vet. Med. Assoc.* 1930. Nov. Vol. 30. No. 5. pp. 595-603. [2 refs.]

it should not be used until it has been kept for at least two weeks, and shaken for approximately five minutes three times a day during this period. From the author's experiments it appears that rabbits can be protected by a single dose of 2 cc. of the vaccine, against a subdural injection with street virus. On a first test 10 of 12 treated rabbits survived, as compared with 2 of 5 controls. On a second test all of 12 treated rabbits survived as against 1 of 5 controls. The author expresses the opinion that "a single dose of 5 cc. for dogs should prove effective against natural infection." He has also found that the filtrate of such a vaccine has no immunizing properties, and suggests that the immunizing principle may result from the reaction between the virus and the tissue cells, or may be a particular "stage" of the virus which occurs only in the tissue cells, and is inseparable from them.

SCHOENING²³ further discusses generally the merits of phenol and chloroform vaccines (this *Bulletin*, Vol. 27, p. 754). Both are safe and efficient; but "no method of vaccination no matter how effective can by itself control outbreaks of rabies. The stray dog is a factor which must always be considered" and legislated against. NEER²⁴ discussing results in Ohio (U.S.A.) comes to the same conclusion.

The sera of dogs vaccinated by various methods against rabies have been examined by FERREIRA and CONTE.²⁵ The results which are given in extenso may be summarized as follows. Of those treated by killed vaccines, rabicidal substances were found in the blood from the 10th to the 19th day in 42 per cent. of animals vaccinated. Of those treated by living vaccines the percentage was 50. From the 30th to the 50th day the percentage of the former group declined to 28, whilst in the case of those treated by living vaccines it rose to 62. Antibodies were found in the blood of 42 per cent. of those treated by dead vaccines, and in 21 per cent. of those treated by living vaccines. These results are based on experiments upon 30 dogs, 14 of which were treated with dead vaccines, and 16 with living.

HERRMANN²⁶ believes that the reduction in mortality which has been observed in a number of institutes during the course of years, depends principally on the fact that patients come more readily for treatment, and so a decrease in the proportion of the severely bitten results. The intensification of treatment apparently also improves results, but it is doubtful if by increasing dosage the period of treatment can be shortened. Experiments show that one and the same dose, if distributed over a number of days, yields a better result than if given on one occasion.

The statistics of anti-rabic treatment at German institutes for the

²³ SCHOENING (H. W.). Prophylactic Vaccination of Dogs against Rabies.—*Jl. Amer. Vet. Med. Assoc.* 1931. May. Vol. 78. No. 5. pp. 703-707. [7 refs.] [U.S. Dept. of Agric., Washington.]

²⁴ NEER (Lester C.). Rabies Control in Ohio.—*Jl. Amer. Vet. Med. Assoc.* 1931. May. Vol. 78. No. 5. pp. 708-709. [1 ref.] [Division of Health, Dayton, Ohio.]

²⁵ FERREIRA (A. Agueda) & CONTE (H. Sá Viana). Recherches des substances rabicides dans le sang des chiens vaccinés contre la rage.—*Arquivos Inst. Bact. Camara Pestana.* 1930. Vol. 6. No. 2. pp. xxvii+1. [19 refs.]

²⁶ HERRMANN (Otto). Ueber die Intensivierung der Tollwutschutzimpfungen.—*Ztschr. f. Immunitätsf. u. Experim. Therap.* 1931. Vol. 70. No. 5/6. pp. 536-540. [7 refs.]

year 1929 are summarized by HESSE.²⁷ 192 persons were treated at six centres, 86 at Breslau by Semple's method, the remainder by the method of Högyes-Philipps. In every case the treatment was successful. The details of these cases are given on the basis of the schedule issued by the League of Nations, and the first review issued by the League (this *Bulletin*, Vol. 28, p. 247) is discussed.

During the year 1930, 589 persons were successfully treated at the Pasteur Institute of Paris.²⁸

The statistics of antirabic treatment at the State Bacteriological Institute at Odessa for the period 1925-1927 are described by PALAWANDOW.²⁹ The treatment employed was that of Fermi. The number of persons bitten was 4,485, of whom one developed rabies (0.02 per cent.). No complications of any sort or paralyses have followed the treatment. The author compares this with a similar period of three years when an intensive dried cord method was in use, when 6 post-vaccinal paralyses occurred.

During the year 1929, 5,295 patients were treated at the Pasteur Institute of Kasauli³⁰ (India), and 2,440 at its out-centres. Of those treated at Kasauli 119 died of rabies (2.01 per cent.); of those treated at out-centres 10 died (0.41 per cent.). The difference in the two mortality rates is mainly due to the practice of transferring patients coming to the out-centres, who are severely bitten, to the parent institute. The mortality rate over the combined figures is 1.54 (Indians 1.68 and Europeans 0.14 per cent.). Complete returns after six months were received in respect of 86 per cent. of the patients treated. The test of the relative efficacies of carbolized and etherized vaccines in equal dosage has been carried out throughout the year, and a report of the results obtained is being prepared for publication.

vi. *Post-vaccinal Paralyses.*

From a study of the histological appearances after intracerebral injection of calf lymph virus, on the one hand, and an attenuated rabies virus on the other, GRINKER³¹ concludes that "attenuated rabies and vaccinia do not produce the pathological changes found in human post-vaccinal (cow pox and rabies) encephalitis." The post-vaccinal encephalites after vaccination against smallpox and rabies are identical and are of the nature of encephalo-myelites; those produced by calf lymph and attenuated rabies virus are meningo-

²⁷ HESSE (Erich). Die Tätigkeit der deutschen Wutschutzstationen im Jahre 1929 und die Ergebnisse einer vom Hygienekomitee des Völkerbundes für das Jahr 1928 veranstalteten Erhebung ueber die Wutschutzbehandlung.—*Reichs-Gesundheitsblatt*. 1931. Jan. 7. Vol. 6. No. 1. pp. 3-7. [1 ref.]

²⁸ VIALA (Jules). Les vaccinations antirabiques à l'Institut Pasteur en 1930.—*Ann. Inst. Pasteur*. 1931. May. Vol. 46. No. 5. pp. 574-578.

²⁹ PALAWANDOW (H. B.). Ueber dreijährige Erfahrungen bei Anwendung karbolisierter antirabischer Vaccine nach Fermi an den Pasteurfilialen des Staatl. Bakteriologischen Institutes zu Odessa.—*Seuchenbekämpfung*. Vienna. 1930. Vol. 7. No. 4. pp. 230-236.

³⁰ KASAULI. Pasteur Institute of India. The Twenty-Ninth Annual Report of the Central Committee of the Association and the Audited Accounts up to March 31st 1930, also the Report of the Director of the Institute for the Year 1929 [CRAIGHEAD (A. C.)]. Part II.—62 pp. Simla.

³¹ GRINKER (Roy R.). Pathology of Experimental Vaccinal and Rabies Encephalitis.—*Proc. Soc. Experim. Biol. & Med.* 1931. Jan. Vol. 28. No. 4. pp. 349-351. [9 refs.] [Med. Dept., Univ., Chicago.]

encephalites. "These findings would seem to suggest that the various types of vaccination and exanthematous diseases in man might act as a stimulant to a latent infection rather than by introducing a specific virus."

SMITH³² describes a case of post-vaccinal paralysis following treatment at the Pasteur Institute at Kasauli (India). The first symptoms were primarily fever, pain in the back, numbness of both legs, difficulty of micturition. Paralysis of both legs followed, knee jerks were absent. This condition continued for a month and was followed by improvement. At the date of writing (9 months after the onset) the patient was much better, but still impaired in health.

vii. *Rabies in Animals.*

Following on REMLINGER and BAILLY's observations on rabies in the cock, IONESCO³³ describes the case of a child wounded deeply on the face by a cock which exhibited symptoms of fury similar to those described by REMLINGER and BAILLY. The cock was killed, and its brain and cord were examined microscopically. The pathological findings were perivascular haemorrhages, lymphocytic infiltrations and Negri bodies similar to those found by the latter authors. An emulsion of the brain injected subdurally into two rabbits caused paralytic rabies, and in the brains of these, Negri bodies were also demonstrated. A second subpassage was also successful. The author emphasizes the necessity for treating persons bitten in similar circumstances, and draws attention particularly to REMLINGER and BAILLY's observation that the cock may recover after having been infective.

It appears from Moroccan statistics that rabies is 7.57 times as frequent in the male as in the female dog. (Of 70 dogs seen at the Pasteur Institute of Tangiers, 63 were male and 7 female.) REMLINGER and BAILLY³⁴ in discussing these figures point out that in Tangiers as elsewhere the number of male dogs is greatly in excess (963 dogs as compared with 358 bitches). The difference in the two sets of proportions—7.57 at the Institute and 2.60 under natural conditions—suggests that selection has crept in in some way, and the authors consider that "it is natural to suppose that, other things being equal, rabies is sensibly more frequent in dogs than in bitches." They would be interested to know whether this relation, observed in Morocco, applies equally to other countries.

SCHLINGMAN³⁵ describes a case of rabies in the dog, which had unusual characteristics. The course of the sickness was protracted to 18 days. The early symptoms were tendency to biting and crossness of temper, which suggested the possibility of rabies infection. On the 15th day slight nervous symptoms appeared; on the 17th day the

³² SMITH (S.). Paralytic Accidents of Antirabic Treatment.—*Jl. Roy. Army Med. Corps.* 1931. Jan. Vol. 56. No. 1. pp. 14-26. [2 refs.]

³³ IONESCO (Demetre). La rage du coq. Application du traitement antirabique à l'homme en cas de morsure.—*Bull. et Mém. Soc. Méd. Hôpit. de Bucarest.* 1930. Oct. Vol. 12. No. 8. pp. 235-237. [2 refs.]

³⁴ REMLINGER (P.) & BAILLY (J.). La rage est-elle plus fréquente chez le chien que chez la chienne?—*Bull. Acad. Vét. de France.* Paris. 1930. Dec. Vol. 3. No. 10. pp. 443-444.

³⁵ SCHLINGMAN (A. S.). An Unusual Case of Canine Rabies.—*Amer. Jl. Public Health.* 1931. Mar. Vol. 21. No. 3. p. 287. [Research Labs., Parke, Davis & Co., Detroit, Mich.]

nervous symptoms subsided, and next morning the dog was found dead. Negri bodies were found in the hippocampus, and animal inoculations were positive.

AUJESZKY³⁶ discusses in all its aspects the antirabic treatment both post-infectional and pre-infectional of domestic animals. In cases of the former type he believes that carbolized and etherized vaccines are the most suitable. For the latter he believes that the Japanese method and the quickly dried vaccine of MIESSNER are efficacious in a single dose.

The statistics of vaccination of animals in Morocco are further extended by REMLINGER and BAILLY³⁷ (see this *Bulletin*, Vol. 27, p. 755, for earlier figures). The number of animals vaccinated after having been bitten now reaches 256 (47 in 1928, 75 in 1929, and 134 in the first nine months of 1930). The number inoculated as a preventive measure were for the same periods 234, 519 and 372, giving a total of 1,125. Ether vaccine, prepared according to the method with which the names of the authors are associated, was employed. The authors are satisfied that with two injections a sufficient degree of immunity is attained. None of the above animals have developed rabies.

After an historical summary of the methods which have been employed for the prophylactic vaccination of dogs, ROSA³⁸ describes a series of experiments comparing the results obtained with a single injection of vaccine with those obtained after two injections. The test dose in each case was approximately one minimum lethal dose, i.e., one four-hundredth of a gram of street virus administered intra-ocularly. A single injection of killed phenol vaccine did not produce appreciable immunity. A single injection of attenuated vaccine prepared according to the method of UMENO and DOI conferred an immunity which lasted for six months (3 of 7 treated dogs died of rabies as compared with 7 of 7 controls). Two injections of the attenuated vaccine conferred an immunity which lasted for at least nine months (6 of 10 treated dogs contracted rabies, as compared with 9 of 10 controls).

DE PAOLI³⁸ describes the symptoms and post-mortem appearances observed in the 89 dogs, which had been infected with street virus in ROSA's experiments. Emphasis is laid upon the fact that in 90 per cent. of the dogs, congestion of the gastro-intestinal mucosa was observed, irrespective of whether the animals had died of furious or dumb rabies, thus confirming the observation of PUNTONI (this *Bulletin*, Vol. 25, p. 714). ZAVAGLI³⁸ describes and illustrates the histopathology of these and other lesions, and concludes that they lend support to the view of PUNTONI that the virus is eliminated from all digestive surfaces, and also to that of MANOUÉLIAN and VIALA that the virulence

³⁶ AUJESZKY (Aladar). Wutschutzimpfung der Haustiere.—*Deut. Tierärztl. Woch.* 1931. Feb. 21. Vol. 39 No. 8. pp. 113-119.

³⁷ REMLINGER (P.) & BAILLY (J.). La vaccination antirabique des animaux et en particulier la vaccination antirabique du chien.—*Bull. Acad. Vét. de France.* 1930. Oct. Vol. 3. pp. 382-387. [11 refs.]

³⁸ ROSA (Bernardo); DE PAOLI (Pietro); ZAVAGLI (Vittorio). Esperimenti di vaccinazione antirabica dei cani: osservazioni cliniche ed anatomo-patologiche. I. Esperimenti di vaccinazione antirabica dei cani con vaccini fenicati [ROSA]. II. Note cliniche ed anatomo-patologiche sulla rabbia sperimentale nei cani [DE PAOLI]. III. Ricerche istopatologiche nei cani morti di rabbia sperimentali [ZAVAGLI].—*Clinica Vet.* 1930. Nov. Vol. 53. No. 11. pp. 695-725; 726-733. With 5 coloured figs. on 2 plates; 733-742. With 4 figs. on 3 plates.

of the various organs depends upon the presence of parasites contained in the nervous elements which penetrate them (this *Bulletin*, Vol. 25, p. 707).

viii. Miscellaneous.

HOYT and JUNGBLUT³⁹ have examined the effects of silver arsphenamine, neo-arsphenamine, tryparsamide, Bayer 205 (germanin), optochin and quinine bisulphate, on white mice, which had received an intra-cerebral dose of virus approximating to a minimal lethal dose. Solutions of the drugs were injected into one of the lateral veins of the tail, and treatment was commenced on the day of intra-cerebral inoculation. No prophylactic or therapeutic effects were observed, though the period of incubation consistently showed a very slight prolongation following the injection of silver arsphenamine.

Reference has frequently been made in these reviews to the researches of Marie PHISALIX on the relationship between venins and the virus of rabies. In the present communication⁴⁰ she summarizes her researches in a monograph of considerable proportions. The observation that a natural immunity to venoms is usually accompanied by a similar immunity towards rabies virus (e.g., in frogs, snakes, fish of the Murenid family, hedgehog, dormouse, etc.), led her to enquire into its characteristics. The double immunity is independent of temperature, venoms and virus acting at all temperatures compatible with animal life. In the case of the eel, the viper, the hedgehog and the dormouse the immunity is humoral, whilst in the frog it appears to depend upon cellular resistance. The resistance of the *Coluber scalaris* is apparently neither humoral or cellular. In the cases where the double immunity is humoral, the venom antibody is distinct from the rabies antibody, the former being inactivated at a lower temperature (70° C.). The sera of the eel, the viper, and the hedgehog may be employed in place of antivenins and antirabic sera. Also mixtures of virus and serum protect the rabbit against intra-cerebral inoculation with fixed virus. These and other conclusions depend upon a mass of detailed experimentation for which the reader must refer to the original monograph.

DA SILVA⁴¹ describes the cases of six persons bitten by a rabid wolf. Five of these were bitten severely on the head and hands, and the sixth on the hands. The latter died of rabies after a short incubation of 23 days. It appeared from the history of the incident, that the individual who succumbed to the disease had been engaged in a protracted struggle with the wolf, and that, in its course, his wounds had been deluged over a comparatively long period with saliva. In the case of the other five, though they were bitten deeply, the period of contact was short. The explanation suggested is that the quantity of saliva absorbed was greater in the fatal case than in the others.

³⁹ HOYT (A.) & JUNGBLUT (C. W.). Experimental Rabies in White Mice and attempted Chemotherapy.—*Jl. Infect. Dis.* 1930. Nov. Vol. 47. No. 5. pp. 418-424. [24 refs.] [College of Physicians & Surgeons, Columbia Univ., New York.]

⁴⁰ PHISALIX (Marie). Rapports entre les venins et le virus rabique.—Reprinted from *Ann. Sci. Nat., Zool.* 1930. 10th Ser. Vol. 13. pp. 63-128. [63 refs.]

⁴¹ DA SILVA (E. Pereira). Sur la pathogénie de la rage (à propos de six cas de morsures graves par un loup enragé).—*Arquivos Inst. Bact. Camara Pestana.* 1930. Vol. 6. No. 2. pp. li+lxix. [3 refs.]

DA SILVA was able to show that antibodies were present in the blood of 4 of the non-fatal cases, but were absent in the fatal and one of the non-fatal cases. He advises that the sera of all severely bitten persons should be systematically examined.

D. M. GREIG⁴² furnishes a scholarly review of BARBIER's "Les Sources de la Virulence Rabique" (Dijon, 1929).

A. G. McKendrick.

ITABASHI (K.). Studies on the Intraplantar Inoculation of Rabic Virus. I. Experiments with *Virus fixe*.—*Selected Contributions from Mukden Inst. for Infectious Diseases of Animals*. 1930. Vol. 1. pp. 141-153. [17 refs.] [In Japanese. English summary pp. 223-224.] [See this *Bulletin*, Vol. 27, p. 755.]

⁴² GREIG (David M.). Hydrophobia.—*Edinburgh Med. Jl.* 1930. Dec. Vol. 37. No. 12. pp. 698-705.

MISCELLANEOUS.

JOHNSON (W. B.). **Notes upon a Journey through Certain Belgian, French and British African Dependencies to observe General Medical Organisation and Methods of Trypanosomiasis Control.**—40 pp. With 21 figs. on 7 plates. 1929. Lagos: Govt. Printer.

This article will deal with medical organization only.* The author went by water from Lagos to Matadi in Belgian Congo, thence to Leopoldville, Luebo and Elizabethville; across the northern portion of N. Rhodesia; in Tanganyika Territory to Dodoma and Dar-es-Salaam; across Kenya Colony via Nairobi; across Uganda via Torit and Rejaf and thence down the Nile to England, the whole journey taking 4 months. Between Lagos and Alexandria, 2,540 miles was traversed by boat, 3,070 miles by rail, 4,000 miles by motor lorry and 550 miles by aeroplane.

Native Hospitals and Dispensary Systems.—Two tables give statistics of the medical services of Belgian Congo, Tanganyika, Uganda and Nigeria. Table II is reproduced.

TABLE II

Country	Proportion of native patients treated to total population.	Proportion of native patients treated per medical officer (total European plus non-European Medical Officers).
Belgian Congo (State Service (1925)	1 in 38.0	2,207†
Tanganyika (1926)	1 in 13.0	3,279
Uganda (1927)	1 in 6.6	6,270
Nigeria (1927)	1 in 61.8	2,218

† Shows proportion receiving State assistance only and does not include the vast amount of work performed by private companies and religious missions.

The tables show, the author thinks, "that Nigeria is behindhand in this important work for the improvement of the general condition of the population," the main reason being the absence of a trained subordinate staff and of rural and small urban dispensaries. He describes some of the hospitals and dispensaries in Belgian Congo. While money has been wisely spent not upon elaborate buildings but upon such conveniences as steam disinfection apparatus, steam cooking and hot water supply to theatres, the general level of cleanliness and nursing does not seem to reach that of Nigeria. Some space is given to the medical services of the large concessionary companies, Huileries Congo Belge, Forminière organizations, Union Minière du Haut Katanga. In 1925 there were 52 medical men attached to these, and 18 to religious organizations. In 1927 the cost of the medical service of the Union Minière was £103,000.

* For Methods of Trypanosomiasis Control see this *Bulletin*, ante, p. 341

The Forminière organizations have a system of standard dressings and drugs tables which greatly simplifies the training of semi-educated African assistants. At Tshikapa native infirmières examine labourers upon enlistment, one searching gland juice for trypanosomes and another scrutinizing a blood film. An account is given of the labour conditions and ordinances [see this *Bulletin*, Vol. 26, p. 409 and elsewhere].

In Tanganyika boys receive a training of three months or longer in the Health Department to become African sanitary inspectors; others are trained at hospitals as tribal dressers.

Native administration dispensaries.—For Uganda a description is given of the system of country dispensaries under the care of Asiatic and African subordinates in connexion with Mulago hospital. Many patients pay for their medicines, a system which works well except in the case of diseases such as yaws and syphilis, in which the thoroughness of the treatment depends on the wealth of the recipient. Patients who are seriously ill are collected by motor ambulance and taken to Mulago.

Training of medical subordinates.—In this section the work in progress in Belgian Congo, Tanganyika, Uganda and the Sudan is described. Of the Indian sub-assistant surgeons in Tanganyika, Dr. Johnson writes—"Generally speaking they appear to be neither energetic nor reliable. I personally believe that a well-educated and trained African as soon as he is available will make a more satisfactory assistant." He was much struck with the human material and the training in Uganda, and comparing the Makerere College in Uganda with the Gordon College in Khartoum thinks it possible that the Uganda boys with their grit and keenness may prove the better material for medical training.

Infant Welfare and Maternity Work.—It is noted that child welfare work has now become an established branch of medical effort throughout Africa. A description is given of the clinics, maternity hospitals and midwifery training schools seen, but the author writes—Campaigns against malaria, venereal diseases, etc., and research leading to improvement of nutritional deficiencies may have a wider influence upon birth rate and infant mortality rate than local attention to mother and child. Uganda was found to be ahead of the colonies visited in its infant welfare and maternity work, which are missionary activities. Valuable work in the training of Mohammedan girls as midwives is being done in Omdurman in the Sudan.

Medical Laboratories and Research Work.—Here notice is directed to the Union Minière Laboratory at Lubumbashi where special attention is given to vaccines and the vaccination of the 20,000 employees of the Company.

A. G. B.

BLACKLOCK (D. B.). **The Prevention of Disorders and Disease in Tropical Countries.**—*Jl. State Med.* 1931. Apr. Vol. 39. No. 4. pp. 204-218.

An admirable paper which should be reprinted for distribution among intelligent laymen. Where the essence of precautions lies in detail, detail is given, e.g., the care of drinking water on the march in Africa. As regards education of doctors Professor Blacklock thinks that the curriculum of the tropical schools is overcrowded. "Our aim should

be that every one should be as far as is possible absolutely sure of the diagnosis and treatment of the common serious tropical diseases, and of the simplest and most effective means of preventing such diseases." Two points to which special attention is drawn are the need for production of quinine in sufficient quantities and at a low enough price to supply the needs of the Empire [the question of the value of the other cinchona alkaloids is not touched] and the need for development of suitable types of properly cooled houses for white men in the tropics. "The householder in this country who has no means of warming his house is no more entitled to complain than the householder in the tropics who has no means of cooling his house."

A. G. B.

BLACKLOCK (D. B.). **Report on a Survey of Human Diseases in the Protectorate of Sierra Leone. Part I—Northern Province.**—44 pp. **Part II—Central and Southern Provinces.**—44 pp. 1930. Freetown.

This Report deals separately with the Northern Province and with the Central and Southern Provinces. The first survey occupied 5½ months and concerned 4,337 persons; the second a year with 5,153 examinations. In the account which follows the two parts are blended. The roughly alphabetical arrangement is preserved.

Ainhum. 24 pronounced cases were seen.

Arthritis. The table shows the findings.

SHOWING JOINTS AFFECTED BY SWELLING OR DEFORMITY, AND BY PAIN ALONE.

Affected Joints.				With Swelling or Deformity.	With Complaint of Pain only.
Clavicular	...	...	...	4	—
Shoulder...	...	...	...	4	10
Elbow	...	...	...	31	5
Wrist	...	...	...	15	6
Hand	...	...	...	34	1
Hip	...	...	...	13	4
Knee	...	...	...	108	41
Ankle	...	...	...	91	6
Foot	...	...	...	73	1
General	...	...	...	—	11
Total	...	...	...	373	85

In the many cases where more than one joint was implicated that most affected is named.

Blood Examination. In 616 blood films no trypanosome was found. In the North the night blood of 259 persons showed *Mfilaria bancrofti* in 38; in the Centre and South this worm was rarer. *Mfilaria loa* was a rare finding and no case of *O. volvulus* was met with.

Agglutination Tests. In a total of 556 persons whose serum was examined for enterica agglutinins there were 61 positive reactions—these in the Centre and South—28 with *Bact. typhosum*, 3 with *paratyphosum* A and 30 with *paratyphosum* B. In the North a few positive tests are recorded and the author says that there is probably no race or area in Sierra Leone which is free.

The Kahn test was carried out in a number of communities ; it varied from 6 per cent. in a girls' school to 86 per cent. among out-patients at Rotifunk ; in a women's hospital it was nearly 60 per cent. The test is largely indicative of yaws infection.

Dermatitis. These cases formed 32-60 per cent. of persons examined on the Northern journeys but were less prevalent in the Centre and South. In 29 cases a pellagra-like eruption was seen on the hands or feet or both. Perleche was noted in the South in 35 cases.

Diseases of Ears. Cases of deafness with or without running ears are tabulated.

Diseases of Eyes. Affection of one or both eyes was noted 420 times. The commonest were—ulcers and opacities of the cornea, pterygium, cataract, blepharitis, ptosis, purulent conjunctivitis, shrunken globe ; the visual power was often gravely affected. One definite and several probable cases of trachoma were seen. Complete blindness in one or both eyes was noted 29 times in the Centre and South.

Elephantiasis. Of 91 cases in 39 the legs were affected and in 47 the scrotum. Here Dr. Blacklock notes the need for local hospitals, for though all in the North who were willing for operation received an introduction to the Freetown hospital, not one reported there.

Ganglia of the wrist was seen in 20 cases : of 15 in which the history was recorded all had yaws.

Gangosa. This condition is discussed at some length and will be considered elsewhere. It was most prevalent in the North, where it is much feared ; 64 cases were there seen.

Gland Enlargement and Scars over Glands. Over 2,000 cases showed one of these conditions. The groups of glands chiefly affected were the inguinal, femoral, and femoral and inguinal, followed by the axillary.

Gonorrhoea. Of 732 males over 14 in the North 44 had acute gonorrhoea and 260 a history of a recent attack. The corresponding figures in the Centre and South were 2,424, 348, and 804—an incidence of nearly 50 per cent. "It is clear that such an incidence with its well-known sequelae of joint involvement, eye infection, and effects upon the female generative apparatus makes it a very important disease in Sierra Leone," but "it is difficult to see how the mass of this disease can be properly treated at any time in the near future," even in males. In many chronic cases an ulcerative process seemed to start on the scrotum : the gonococcus, Blacklock thinks, may be responsible for much skin disease affecting the genital region in the tropics.

Of *Perineal fistula* there were 10 cases with a history of gonorrhoea, of which it is a late effect.

Hernia and Hydrocele. 1,324 cases. The umbilical hernias far outnumbered the other forms, but when umbilical, inguinal, and femoral were arranged in age periods the inguinals outnumbered the umbilical in the 3rd or at least 5th decade. Among males inguinal hernias of large size were common. Of hydrocele some 300 cases were seen.

Leprosy was more common in the North than in the Centre and South, 183 cases against 60. It is suggested that the villages on the motor roads do not encourage the presence of lepers and that these have difficulty at present in reaching the road when warned to come for examination. There is no evidence of any form of native segregation.

Liver Enlargement of unknown origin was noted in 17 males.

Muscular Paralysis. 42 cases are tabulated. Two women had signs of tabes and paresis of one or both eyelids was recorded in 28 cases.

Mycetoma-like conditions. Six cases are described. They cause serious deformity and invaliding and call for investigation.

Phthisis. This disease finds no place in the survey of the Centre and South. In the North no case of lung disease was due to the tubercle bacillus, but cases of long duration were seen with fever, emaciation, rapid pulse and respiration with cough and purulent expectoration.

Schistosomiasis was little encountered in the North. In the Centre and

South 105 examinations of 952 urines were positive. A table is given of the findings in school children. Ten endemic localities are named; in 8 of these *Physopsis globosa* was found and in 5 again dissection revealed cercariae of human schistosomiasis. The conditions at three of the highly infected villages are discussed. Here there is a heavy infection rate among school children and the risk is indicated of transferring scholars from endemic to non-endemic areas where the carrier snail may be present. The schools should be provided with samples of snails and a record of findings kept by the schoolmaster. "From the educational point of view I cannot imagine a more simple or more profitable form of Nature Study for Protectorate school boys than a properly organized and conducted survey for physopsis."

Lesions of Soles were found in 1,339 cases. In some villages the whole male population seemed to have tender feet and could walk only with difficulty. The age and sex incidence is tabulated. There was a history of yaws in 741 of 1,022 males and 286 of 317 females.

Sleeping Sickness. Three cases are mentioned, one doubtful. It is described as insignificant in its effects compared with many other diseases.

Smallpox. No case was seen. It is noted without explanation that the dread of vaccination prevents many natives coming for examination.

Subcutaneous and juxta-articular nodules are grouped; 475 cases were seen. The age and sex incidence are given without attempt to differentiate the forms. The *O. volvulus* nodules are usually near joints.

Congenital Syphilis. Examination of 3,858 persons for Hutchinson's teeth discovered one case, and of 3,595 for sabre tibiae 38. The author points out that the incidence of congenital syphilis depends on which criterion is adopted.

Acquired Syphilis. Under this head is a table showing the age incidence of 334 cases of lesions of the skin of the penis and glans. The majority, 118, occurred in the age period 11-20. Skin infection accounted for most but many were due to injury at circumcision; 10 such cases are tabulated; the ages varied between 3 and 36 years. Many lesions were associated with gonorrhoea, others with a history of yaws; 29 might have been syphilitic. The evidence of primary acquired syphilis on these journeys was almost negligible.

"It appears to me that the acute gonorrhoea-primary chancre ratio in the Protectorate is so abnormal that one must conclude that some factor is at work which either prevents *Sp. pallidum* from causing infection or at least prevents syphilitic sores of the genitals assuming a characteristic form."

Ulcers, Sinuses and Scars.—A record was kept in the North, excluding multiple ulcers associated with gangosa, affection of glands, yaws and leprosy. Of 2,194 persons 708 were affected.

SHOWING INCIDENCE OF ULCERS, SINUSES AND SCARS IN 708 CASES AFFECTED.

Area.	Total Examined.	Ulcers.	Sinuses.	Scars.	Dry Ulcers Soles Feet.
Gbabai to Yonibana ...	622	101	84	68	43
Port Loko to Batkanu, etc.	497	52	24	38	7
Magburaka to Kamabai ...	1,075	140	85	191	30

Yaws. On one journey, of 710 persons 73 per cent. were affected.

AGE AND SEX DISTRIBUTION OF 719 CASES OF YAWS.

Age Period.					Males.	Females.
0-10	...	...	...	...	285	211
11-20	...	...	...	...	60	43
21-30	...	...	...	...	21	57
31-40	...	...	...	...	12	12
41-50	...	...	...	...	12	6
Totals					390	329

The table shows well the age incidence. Another tables gives the site of the primary lesion ; it is commonest on the foot ; next on the knee and finger. 54 per cent. of the total population examined were or had been affected. The treatment of this disease, the author writes, should be extended.

The 2nd Report concludes with a review of the present position at Kaiyima [see this *Bulletin*, Vol. 22, pp. 463 & 652 ; Vol. 24, p. 514]. In 1923-4 the villagers were strongly affected with goitre and schistosomias, the first largely attributed to bad sanitation, the second due to Physopsis which flourishes under such conditions. The goitre figures were for males 41 per cent., for females 72 per cent., and the schistosomiasis figure was 65 per cent. The measures taken were—provision of a pure drinking water supply, of a safe method of disposal of excreta and village refuse away from water, and of snail-free bathing and washing places, with treatment of polluted waters and effective control.

In September 1929 the villagers were re-examined. The goitre per centage had fallen from 41 to 23 per cent. in males and from 72 to 52 in females, and many of the goitres were slight. The percentage of schistosome ova in boys had fallen from 65 to 42 per cent. and the infections were much less severe. The medical officer is now to be removed from Kaiyima, but it is suggested that for the encouragement of the Paramount Chief, who has done good work, a dispensary should be maintained for one or two years longer.

A table gives the percentages of various diseases in the Northern and Central and Southern provinces respectively.

" It will be observed that there is a similarity in the percentage incidence of the following :—

" Arthritis, diseases of the eyes, hernia, and the typhoid group ; that the incidence of the following diseases is less in the Central and Southern Provinces :—Dermatitis, elephantiasis, gangosa, gland affections, goitre, leprosy, subcutaneous and juxta-articular nodules and yaws (Framboesia) ; while the incidence of gonorrhoea and schistosomiasis is higher in the Central and Southern figures than in the Northern."

It is stated that the Southerners are better fed and wear more clothes, which may account for the lower figures of diseases dependent on insect transmission and infection through skin abrasions.

The author discusses the diseases described from various points of view. To the native the most serious are cutnose (gangosa), arthritis, leprosy and in endemic areas bigneck (goitre) ; to the clinician the order of importance is malaria, gonorrhoea, yaws ; to the research worker probably parasitic skin disease, goundou and ainhum. He points out that the malaria problem is one of educating the African in elementary sanitation, and such education should be supplied as widely as possible. He would defer an attempt to deal with leprosy till further investigation has been made in other provinces. More surgical assistance should be available for the natives of the Northern Province.

A. G. B.

BOYÉ. L'emploi de la main-d'oeuvre chinoise au Congo Français. [**The Employment of Chinese Labour in French Congo.**—*Bull. Office Internat. d'Hyg. Publique.* 1931. Jan. Vol. 23. No. 1. pp. 78-91. [2 refs.]]

In the construction of the railway from Brazzaville, at the limit of the navigable Congo, to Pointe-Noire on the Atlantic Ocean it was necessary to supplement the scanty local labour, and though the precedents were not encouraging the authorities turned to the Chinese. Previous attempts to introduce Chinese labour into Tropical Africa had ended disastrously, in the French Sudan in 1882, in Madagascar, and in Belgian Congo 10 years later, but the immense progress made since then in the hygiene of groups of natives justified a fresh trial.

The mortality in previous attempts.—Of the 35 Chinese introduced into French Sudan in 1882 records are few, but all seem to have disappeared. In 1892 529 Chinese coolies were embarked at Macao for Matadi, Belgian Congo, for railway construction. The losses on the voyage are not known. Less than 4 months after their arrival there remained 300, a loss of 43 per cent., and 26 months after their arrival only 170, who were repatriated. The total loss was 68 per cent. The most deadly diseases were, malaria, dysentery, beriberi and phagedenic ulcers, usually the sequel of jigger wounds. The ration consisted of imported polished rice 500 gm., or manioc 750, dried fish 250 gm. or bananas 1 kg., and salt 10 gm., and little to supplement it was obtainable in the native market. The losses in Europeans were likewise heavy, so that it is said to this day of the Matadi-Leopoldville railway: For every kilometre a European, for every sleeper a native. Similar losses occurred among 20 Annamites brought to French Congo as market gardeners about the same time but one of these is still alive at Brazzaville. Among 600 Chinese brought to Madagascar in 1896 and 1897 the losses again were great and after a year the remainder were repatriated. A writer of the period, after calling attention to the aversion of these Asiatics for sustained physical effort, attributed the failure largely to the jigger flea.

Chinese labour in French Congo, 1929-30.—In 1929 the men to be recruited were carefully examined in China. They were vaccinated against enteric and cholera, against plague and against smallpox. They were loused. To clear them of intestinal parasites they received on 3 successive days 2 gm. thymol (this was incomplete in many instances). Each received a medical card recording vaccinations and initial weight, on which the medical history would be kept. Lastly, before embarkation a final visit was paid to eliminate any acute disease. On board ship the diet was a congenial one with the usual Chinese condiments. The rice was red, not polished. To guard against chill off the Cape of Good Hope each man was provided with woollen clothing and supplementary blankets were available. The coolies were accompanied by a European and a Chinese doctor, from the Hanoi school of medicine, who was to remain in the Congo.

The Government of Equatorial Africa received detailed instructions for the reception and maintenance of the coolies. Regular consignments of food were received from the country of origin, notably tea. All these matters were supervised by Dr. LASNET, both in Indo-China and in Africa.

782 coolies were embarked at Kuang-Chau-Wan and disembarked two months later in the Congo. They were taken to camps prepared

for them. The ration was calculated to furnish 3,000 calories a day for a man of 50-60 kilos weight working 9 hours. It was as follows—

	Dry rice	...	...	...	...	...	700 gm.
or	Bread	...	...	...	...	...	250 "
	and						
	Dry rice	...	...	...	...	...	500 "
	Fresh or salted meat	...	...	...	...	...	200 "
or	Dried or salted fish	...	...	...	...	...	200 "
or	Fresh fish	...	...	...	...	...	400 "
	Green vegetables	...	...	...	...	...	300 "
or	Dried	...	...	...	...	...	150 "
	Salt	...	...	...	...	...	20 "
	Tea	...	...	...	...	...	5 "
	Fat	...	...	...	...	...	20 "

The dried vegetables and preserved meat were to be distributed only when fresh food was absolutely unobtainable. The local administration had to import cattle and pigs, and at times to fall back on game animals. An industrial product known as *pâte azotée* (a preparation of fish) was employed with success in convalescents and the ailing. Fruits and vegetables were grown on the spot.

Details of the care of the coolies in Africa follow. They were trained for the work they had to perform and were suitably protected against the weather. Hats with broad brims were brought from China. The morning meal was taken in the camp. The hours of work were limited and a rest taken at midday. Good water or tea was provided at all hours.

A daily dose of 0.5 gm. quinine was given under the surveillance of a European. Controls by the use of Tanret's reaction with appropriate punishments for failure to swallow the dose were at first used but became unnecessary. Mosquito nets were employed but not by all. Thanks to the precautions taken malaria was rare; there were only 8 deaths, 2 of them from blackwater [no information of the malarial index of the surrounding natives]. Against dysentery, vaccination by anatoxin according to Ramon's technique was general. The fear of beriberi was always before the authorities. Several cases were reported but only 10 deaths. It was met by the prompt substitution of wheaten bread for rice in the gang affected; and the addition to the diet of ground nuts, fruits, green vegetables and *pâte azotée*. To protect them against jiggers boots were furnished and against wounds of the legs puttees. These measures were also protective against hookworm. No cases of sleeping sickness occurred; efforts to eliminate it from the region concerned were made before the coolies came.

There were 30 deaths [? 31] (beriberi 10, malaria 6, blackwater 2, dysentery 3, pneumonia 2, other causes (not endemic) 8); a percentage of 4 in 15 months; and in the last 3 months only one death. [This percentage is not strictly correct, for 172 Chinese were deported as undesirables after 5 months.] The health of the Chinese coolies, with the exception of one month, was better than that of the African natives who worked alongside them.

The experiment has proved [for the layman's benefit] that by the strict application of the laws of health and of the prophylactic measures that increased knowledge of tropical medicine has brought us, Asiatic labour may be safely employed in Tropical Africa.

A. G. B.

PROCTER (R. A. W.). **The Health of Labour on the Kisumu-Yala Railway Construction.**—*Kenya & East African Med. Jl.* 1931. Jan. Vol. 7. No. 10. pp. 276-281. [1 ref.]

The author describes briefly the siting of the camps, clearings, latrines, in which there was no nuisance so long as a sweeper could be obtained, huts, ration, etc. Special measures were applied for malaria but the expense was considered hardly justified. Hospital requirements were estimated at 60 beds; throughout the year approximately 2,200 boys were employed each month and there was an average of 11 admissions to hospital per month, so that the provision was too ample. The 131 admissions were headed by malaria, local injuries, ulcers, pneumonia; dysentery and typhoid accounted for two each. The low sick rate was attributed mainly to the fact that all the labour until the last 3 months was drawn from the neighbouring Reserve, and that 1929 was a healthy year [a consideration which often fails to be stated]. It is also noted that the camps were well sited, and the diet was adequate. The diet scale was as follows—

Maize meal	...	...	...	...	...	11 lbs. weekly.
Chiroko or other pulses	...	...	...	...	...	1½ lbs. weekly.
(or fresh meat 1 lb.)						
(or dried meat ½ lb.)						
Fresh meat	...	...	...	...	...	1 lb. weekly.
(or dried meat ½ lb. weekly)						
Ground nuts	...	...	...	...	...	1 lb. weekly.
(or ghee or fat ¼ lb. weekly)						
Fresh vegetables	...	...	...	...	...	1 lb. weekly
(or potatoes 2 lbs.)						
(or lemons 2)						
(or oranges 2)						
(or limes 6)						
Salt	...	...	...	...	...	¼ lb. weekly.

Cooking pots and fuel supplied by contractor.

One cook to twenty boys

The net cost for medical services was £1,550, equivalent to less than 15 shillings per boy per annum.

A. G. B.

BRUXELLES-MÉDICAL. 1931. Jan. 11. Vol. 11. No. 11. pp. ccclxxii-ccclxxiv, ccclxxvi-ccclxxviii.—Sur le recrutement des médecins pour la Colonie. [**The Recruitment of Doctors for Belgian Congo.**]

The Editorial Committee of the *Bruxelles-Médical* organized a conference for an exchange of views on this subject. A questionnaire drawn up previously is given. It seeks information on such topics as the reasons why doctors on leaving the universities do not embrace a Colonial career, the sufficiency of the salaries, the scarcity of military doctors in the Colony, methods of propaganda for recruitment, the creation of courses of tropical medicine at the universities, the engagement of women doctors, the eligibility of doctors for high posts in the administration. A consensus of opinion was to the effect that morbidity in the tropics and insecurity of career as compared with Belgium were the chief causes of the reluctance to embark on colonial medical life. To combat these objections, regarded as exaggerated, propaganda must be carried into the bosom of the families concerned. Salaries

at least are much better than in French Africa. It is suggested that official positions in Belgium should be assured by law for the doctors returned from Africa, and they should be insured when they first enter the Colony against sickness and accident. It is pointed out, however, that the causes of the scarcity of doctors lie deeper: France meets with great difficulties and even Holland and England do not find the position easy.

"On pourrait se demander s'il n'y a pas, de par le monde, une sorte de *défaitisme colonial*, *défaitisme* fréquemment encouragé par les doctrines de Moscou répandues un peu partout, bruyamment encouragées aux extrêmes gauches, mais occultement et souvent inconsciemment suivies dans beaucoup de milieux bourgeois, et cela dans tous les pays."

It is suggested that the colonial mind is wanting in Belgium. The absence of enthusiasm is shown by the paucity of military doctors in the Colony. Suggestions for the improvement of the position are made.

A. G. B.

MOELLER (J.). Rapport concernant son séjour à l'hôpital de Kisantu de septembre 1929 à mars 1930. [**Visit to the Kisantu Hospital (Belgian Congo).**]—*Ann. Soc. Belge de Méd. Trop.* 1930. Sept. 30. Vol. 10. No. 3. pp. 311-324.

In 1926 the University of Louvain decided to found in Belgian Congo a medical institute where Colonial doctors would supplement the instruction they had received in Belgium, native *infirmiers* and medical assistants would be trained and research carried out on animal and vegetal tropical pathology. This is designated Fomulac (Foundation Médicale de l'Université de Louvain au Congo). At the end of three year the enterprise had thriven so well that there had been built a native hospital, clinic for Europeans, research institute, school for *infirmiers*, the whole in eight blocks, electrically lit and supplied with running water.

Here the author spent about six months and he discusses in his article the treatment of pneumonia by salicylate of soda, tropical ulcer and the organization of a sleeping sickness campaign. The salicylate of soda was given by mouth 4 to 6 grams a day for 6-8 days, he believed with good effect, in 17 cases. It does not replace but is additional to the usual treatment. In grave cases it may be given by the veins (3 grams a day in a 1/30 solution). A careful investigation of the 4 chiefries of the district with its 10,000 inhabitants was made for sleeping sickness. Over 10,000 natives were seen and in over 1,000 a gland was punctured but only 4 cases were discovered. Sleeping sickness has been combated here for 20 years by the Kisantu missionaries and is evidently under good control. The population is growing.

A. G. B.

VAN NITSEN (R.). Diagnostic et traitement des affections intestinales chez les travailleurs industriels du Katanga. [**Diagnosis and Treatment of Intestinal Affections in Industrial Workers of the Katanga.**]—*Bull. Méd. du Katanga.* 1930. Vol. 7. No. 4. pp. 93-107.

A didactic clinical paper which cannot be summarized. The table is of interest as showing the difference in parasitic infestations in natives from different districts.

	Rhodesians.	Congo (principally Lomami).	Ruanda- Urundi.
Number of examinations	2,453	1,765	5,641
Ankylostomes	898 or 36.61%	538 or 30.48%	481 or 8.53%
Trichocephalus	43 or 1.75%	61 or 3.45%	1,711 or 30.33%
Ascaris ...	136 or 7.17%	54 or 3.06%	586 or 10.39%
Taenia ...	49 or 1.99%	24 or 1.36%	451 or 7.99%
Strongyloides ...	121 or 4.93%	115 or 6.51%	205 or 3.63%
Bilharzia ...	80 or 3.26%	228 or 12.92%	44 or 0.78%
Amoebae ...	3 or 0.12%	3 or 0.12%	134 or 2.37%
Trichomonas, Giardia and Balantidium	179 or 7.30%	69 or 3.91%	327 or 5.79%

A. G. B.

GASCA (A.). Rapport sur la croisière médicale du bateau hôpital "Belgique" de Berghe-Sainte-Marie à Kabinda. [**Cruise of a Hospital Ship on the Congo.**]*—Ann. Soc. Belge de Méd. Trop.* 1930. Sept. 30. Vol. 10. No. 3. pp. 285-310.

This article consists of a series of notes on sleeping sickness and other diseases seen on the left bank of the Congo between the mouths of the Kasai and Ubangui rivers in the course of a 2-3 months' cruise. The author reports on 65 villages in which 5,717 natives were examined for trypanosome infection, or with others examined previously by Dr. STANFORD, 8,664. A total of 95 fresh infections was found, i.e. 1.09 per cent., and, including old cases, 417, i.e. 4.8 per cent. All were treated and arrangements were made for their future treatment at neighbouring stations; 790 glands were punctured. Yaws was commonly found, and 17 cases of leprosy were recognized.

A. G. B.

SCHWETZ (J.). Deux voyages d'études médicales et paramédicales dans le Bas-Lomami. [**Two Medical Tours on the Lower Lomami River.**]*—Ann. Soc. Belge de Méd. Trop.* 1930. Dec. 31. Vol. 10. No. 4. pp. 385-403. With 1 map. [4 refs.]

Much of this is of purely local interest. The Lower Lomami, which runs north to join the Congo at Isangi, is reckoned to start from Obenge Bengé at nearly 2° S., a stretch of 250 km. as the crow flies. The author visited this area with a small steamer in June and July 1928, and again in October-November the following year. Here the tsetse which AUSTEN has described as *G. newsteadi* was found. *G. palpalis* is present everywhere, increasing in numbers as the river is ascended, and on all the tributaries explored. The crepuscular forms, *G. fusca* and *G. tabaniformis*, were also found. On the voyage down 15,644 natives were examined in 50 villages. Nine old cases of sleeping sickness were detected and 6 fresh cases; the author thinks the real number would be double. No cases were found above Loya, which is situate halfway along this stretch of river, though *palpalis* goes all the way. As to other diseases, the author merely lined up the natives

and made an external examination. Yaws and ulcers are very common ; 56 cases of leprosy were diagnosed, 40 in men and 16 in women. Of the forms of itch, filarial itch (*O. volvulus*) was common. The natives call the thickened skin "ngosi ya tembo"—elephant's skin. All have subcutaneous nodules, chiefly on the ribs ; these contain adult *Onchocerca*. Below Opala the disease is very rare though the carrier, *Simulium damnosum*, abounds below as it does above. Whereas the other tribes inhabit separate huts, the affected tribespeople live in long barracks with a common verandah, which probably facilitates contagion. Juxta-articular nodules also are general, chiefly in male adults. They are found (in that order) on hips, elbows and knees, ankles, shoulders, vertebral column and, rarely, on the ribs. Association with yaws is here comprehensible, but why are these nodules absent in other places where yaws is common ? As a rule these nodules can be distinguished from those of *Onchocerca* : if not, puncture or excision will settle the matter. Twenty species of mosquito are listed, bred from larvae collected, and 11 species of adult mosquito, 4 of which are not represented in the first list.

A. G. B.

BOUFFARD. L'assistance médicale et l'hygiène publique en Côte d'Ivoire. [**Medical Assistance and Public Health in the Ivory Coast.**].—*Ann. de Méd. et de Pharm. Colon.* 1930. Oct.-Nov.-Dec. Vol. 28. No. 4. pp. 513-556.

This article, which is evidently intended partly for the layman, deals with the general organization of the health service in the Ivory Coast, the hospitals of various grades, child welfare centres ; with the medical personnel of the Colony, midwives, medical assistants ; with sanitation of houses and villages, labour agglomerations, public works, and with a few of the endemic diseases.

A. G. B.

KLEINE (F. K.). Erfahrungen einer ärztlichen Studienreise nach Ostafrika. [**Medical Experiences on a Visit to East Africa.**].—*Deut. Med. Woch.* 1931. Jan. 23 & 30. Vol. 57. Nos. 4 & 5. pp. 153-155 ; 194-196. [17 refs.] [Robert Koch Inst., Berlin.]

About half this account of Professor Kleine's experiences relates to trypanosomiasis and is considered elsewhere. Seeing that bugs are common in African huts and that bugs are proved to be occasional transmitters of spirochaetes, the author fed a dozen *Ornithodoros moubata* on 2 white rats and when the rats' blood swarmed with spirochaetes put them in a bug-infested box to which the bugs were strictly confined. Four days later he removed the sick rats and every few days for 6 weeks put in fresh ones. None became infected, though the experiments were 4 times repeated. Nor did clean rats become infected even when confined for a week with sick rats. In the gut smears of 25 bugs examined after 4 days' feeding on infected rats a few spirochaetes were found, but none in 77 bugs (gut or organs) killed from 4 to 40 days later.

The author discusses his experiences with diphtheria and scarlet fever tests in native children [see this *Bulletin*, Vol. 27, p. 558] ; he thinks that an explanation of his results—all negative for Schick, all positive to Schultz-Charlton reaction—is yet to seek.

Professor Kleine's tuberculosis experiences have been recently noticed

[*ante*, p. 30]. They concern only a small number but lead him to the belief that tuberculosis usually runs a benign course if the natives are well fed and remain quietly at home and that there is no fear of an epidemic outbreak of tuberculosis in Central Africa.

He saw two cases of paralysis after probable polyomyelitis and Dr. ATIMAN described to him cases, of which he had seen 17, with 10 deaths, which were at first taken for chronic sleeping sickness but which Kleine believes to be epidemic encephalitis. Kleine himself saw 3 such cases.

East Coast fever, rinderpest and horse sickness are also discussed.

A. G. B.

ORENSTEIN (A. J.). **The Clinical Significance of Certain Common Parasites of Man in South Africa, with Outlines of Treatment.**—*Jl. Med. Assoc. South Africa.* 1930. Aug. 9. Vol. 4. No. 15. pp. 447–452.

The parasites, or rather the infections caused by them, are amoebiasis, trichomoniasis, hookworm infestation, schistosomiasis and malaria. The author gives full details of his methods of treatment, especially in malaria. His experience makes these of considerable interest but limits of space prevent their description here. He notes that amoebic dysentery of the acute type met with in the tropics is seldom seen in the Union. The symptoms are frequently vague. He is of those who think that trichomonas infection causes symptoms which clear up when the flagellates disappear. He gives medicinal methylene blue by mouth, 2 to 3 grains every two hours till the sclera and urine are blue. The patient is put, as far as possible, on a pure protein diet. The treatment is usually effective.

A. G. B.

- i. THORNTON (E. N.). **A Medical and Nursing Service for Natives in South Africa.**—*Jl. Med. Assoc. South Africa.* 1930. Sept. 13. Vol. 4. No. 17. pp. 507–511.
- ii. MCCORD (J. B.). **A Native Medical Service in South Africa.**—*Ibid.* pp. 511–514.
- iii. LORAM (C. T.). **The Training of Natives in Medicine and Public Health.**—*Ibid.* pp. 515–517.
- iv. ROSS (G. A. Park). **A Medical and Nursing Service for Natives in South Africa.**—*Ibid.* pp. 519–522.
- v. **Discussion on Native Medical Service.**—*Ibid.* pp. 519–522.

The report of the Committee appointed by the Union Government to inquire into the training of natives in medicine and public health was recently noticed in this *Bulletin* (Vol. 27, p. 40). This subject, or that part of it which relates to medical services in rural areas, was put down for consideration at the Annual Meeting of the South African Medical Association held at Durban, and we have here the four papers which were contributed and the discussion. The Committee recommended the institution of a Government Native Medical Service comprising medical practitioners, nurses, and health assistants all of whom would be full-time Government servants. The units would consist of a native medical officer with hospital and one or more health assistants, with two or more nursing stations each

under the charge of a native resident nurse-midwife. The native doctors would have the same training as the European and it should take place in Africa.

i. Sir E. N. Thornton, Assistant Health Officer for the Union, agreed on the really urgent need for natives having reasonable facilities for the preservation of health and adequate medical, surgical and nursing assistance when ill. He notes that in Natal some 1,250 native herbalists are licensed by the State at £3 per head per annum. He criticizes the Committee's scheme in detail, describing it as somewhat grandiose, and thinks they have under-estimated the necessary expenditure. He suggests that the creation of a number of subsidized native practitioners would add enormously to the difficulties of European doctors, for sooner or later the natives would tend to set up practice in the towns. In his view the problem is to give reasonable medical aid to the many as quickly as possible rather than the best in the future to the few, and he considers that the proposal to train native doctors should be rejected. He would use the district surgeon, who is already there, to supervise the work of health centres. In some districts he might become a whole-time medical officer. The natives should be trained, not as doctors, but on the lines of the Auxiliary medical officers in French West Africa. The native medicine men would be gradually replaced by the health centres. The Health Assistants could be trained at Durban under missionary auspices. The cost of the author's plan would be one-third of that of the Committee.

ii. Dr. McCord, of the American Board of Missions in Durban, compared the schemes put forward by the Committee and by Sir E. Thornton. He thinks that the cost of running a health centre will be much less than is anticipated. The Zulu expects to pay for treatment, indeed "doesn't want treatment that he doesn't pay for." In the Mission Nursing Home on the Berea (Basutoland) patients' fees pay 75 per cent. of the expenses of the institution. He thinks that a grant of £500 for each health centre would be enough. He questions the policy of putting the district surgeon in charge, and thinks that the health unit should be a full-time job. He urges the medical profession in South Africa to come to an agreement on what they want.

iii. Dr. C. T. Loram, who was Chairman of the Committee whose Report is under discussion, gives an account of the salient points of the Committee's recommendations and deals with some of Sir E. Thornton's objections. The non-recurrent cost of buildings and equipment for the training of natives in medicine and public health was estimated at £65,000 and this sum will be furnished by the Rockefeller Foundation, provided that Government finds the running expenses.

iv. Dr. Park Ross points out that the ideas of the native are rapidly changing in favour of European methods and instances their behaviour in an epidemic of malaria in Natal and Zululand in 1929 in which there were 3,000 deaths. After discussion with the chiefs 19 natives were given two weeks' training in the rough clinical recognition of malaria, in the taking of temperature and blood-slides and estimation of haemoglobin, in recognition of anopheles larvae and use of oil and Paris green, and also in their capacity of lecturing and dealing with hecklers. The pupils must be young and well educated and have a good knowledge of English. The result was excellent and only one contracted malaria. He has had requests from chiefs for the return

of these men for the next season. He agrees with McCord that the native should pay for the service he gets, and is averse to the State financing the training of native doctors.

v. The discussion on these papers was rambling and seemed to show much diversity of opinion. Resolutions were passed that no distinctions on ground of colour should be made in the qualifications of medical men, nurses and health visitors, and that the Federal Council be requested to formulate proposals for a rural medical, nursing and health service for submission to the Government on behalf of the Association.

A. G. B.

- i. HYND (David). **A "Medical Unit" in a Rural Area.**—*Jl. Med. Assoc. South Africa*. 1931. Mar. 14. Vol. 5. No. 5. p. 141.
- ii. JOURNAL OF THE MEDICAL ASSOCIATION OF SOUTH AFRICA. 1931. Mar. 14. Vol. 5. No. 5. pp. 148-149. **A Native Location Medical Service. Proposals to establish a Service of Native Location Medical Officers. Submitted for Discussion to the Natal Medical Council by Dr. Campbell Watt, in Connection with a Resolution from the Durban Medical Society.**

i. The medical unit in question has been established by the Nazarene Mission in Swaziland, and consists of a central hospital and medical outposts, with two qualified doctors in charge and three fully trained nurses. The author holds that the profession should "give the weight of its influence in South Africa to the admission of all suitable students to our medical schools irrespective of colour." Male native medical assistants are being trained in a similar way to the native female nurses. The scheme is in its infancy; there are no details of cost.

ii. A summary of the scheme is given. The training of native doctors at Government cost is recommended, as a charge against the Native Affairs Vote.

A. G. B.

- JOURNAL OF THE MEDICAL ASSOCIATION OF SOUTH AFRICA. 1931. Jan. 24. Vol. 5. No. 2. pp. 35-46.—**Medical Services in Native Areas. Some Instructive Views and Opinions.** (i) **A Medical Service for Natives in South Africa** [GOOL (A. H.) pp. 35-37; MAHLANGENI, p. 37; SOGA (A. R. B.) p. 38]. (ii) **The Training of Natives in Medicine. Notes on a Native Medical Service in Rural Areas** [XUMA (A. B.) pp. 39-43]. **Medical Services to the Natives** [WELSH (Robert H.) pp. 44-46].

The Editor of the *Journal of the Medical Association of South Africa* addressed a letter to all native colleagues in the Union seeking their views as to the establishment of a special training school for native medical students, giving an inferior degree; the admission of such students to the preliminary studies at the Universities; their subsequent training in special native hospitals or abroad. Some of the replies are published in this number and will repay perusal.

A. G. B.

ONORATO (R.). Lo stato attuale delle nostre conoscenze sulla nosografia tripolitana. [**The Present State of Knowledge of Disease in Tripolitania.**—*Arch. Ital. Sci. Med. Colon.* 1931. Mar. 1. Vol. 12. No. 3. pp. 137–186. With 9 diagrams. English summary (7 lines).

The information presented in this article covers so extensive a field and is already so condensed that abstraction is difficult. The author deals not only with tropical conditions but also with infective diseases, medical and surgical affections generally, and vital statistics.

General mortality has varied little during the last 10 years, and the average from 1912 to 1929 has been 35·31 per mille, that among Europeans being 18·47, among the natives 41·06. Infant mortality for the same period is given as 17·58 per mille, Europeans 6·78, natives 20·51.

Respiratory diseases, notably tuberculosis, pneumonia and bronchitis, account for 23 per cent. of the general death rate and are rife in the late autumn and winter. Venereal disease is common, mainly gonorrhoea and syphilis in the muco-cutaneous forms. Other skin affections are mycetomas, particularly nocardia and cohnistreptothrix infections. Ocular diseases, conjunctivitis and trachoma, are widespread, but are said to be diminishing. Of the infections, *tuberculosis* heads the list, the average total mortality in the years 1912–26 being given as 205·8; influenza follows with 75·1, enteric fever 43·1, measles 33·9 and malaria 29·8. The cause of the high figure for enteric is not known, but general sanitation is of a low standard and flies are a pest; the water supply has not been incriminated. *Smallpox* was a scourge in early days of Italian occupation, but as a result of vaccination on a large scale, has been practically eradicated; sporadic cases, about 17 annually, have occurred during the last 18 years with the exception of 1921 when there were 113 reported. *Malaria*, owing to measures of sanitation, bonification, and the widespread use of quinine, is no longer of great moment; the average death rate, 1912–25, was 0·55 per mille inhabitants, 0·08 Europeans, 0·69 natives. Tertian [? benign] is the common type, and the vector is *A. maculipennis*. *Plague* has occurred in small epidemics; in 1913 there were 82 cases, in 1917 43 cases, all bubonic; there have been none during 1926–29 inclusive. *Leprosy* is more common in Cyrenaica, rare in Tripolitania, only 14 cases having been reported in 1912–29. Louse-borne *relapsing fever* occurs, but is not common. Few cases of amoebiasis are reported, and helminthic infestations by *Paragonimus*, *Schistosoma haematobium*, *Diphyllbothrium* and hydatid are met with but are rare. Cutaneous leishmaniasis is also seen and very rarely kala azar.

H. H. S.

GARCIA DE OBESO (Lope). Contribución al estudio de la patología rifena. [**Disease in the Rif Country.**—*Medicina Paises Cálidos.* Madrid. 1930. May. Vol. 3. No. 3. pp. 200–231. With 20 text figs. & 2 maps. [51 refs.]

The district considered is known as the Guelaia territory, a tongue of land directed towards Spain.

Syphilis is very rife; different areas return from 70 to 88 per cent. of the population as affected. Much of it is cutaneous and this is held to account for the rarity of neurosyphilis. The disease is severe and inadequately treated, hence many instances of repulsive facial mutilations due to tertiary lesions are met with.

In Guelala some 6 per cent. of the inhabitants were found to be tuberculous. On the littoral osseous lesions were commonest, pulmonary coming next; in Fez more than half were pulmonary, nearly a third were glandular and less than 10 per cent. were osseous.

Malaria is infrequent, only 81 patients being treated, and among the total reporting sick about 4 per cent. were cases of malaria. Nearly all were *P. vivax* infections; subtertian was very rare.

H. H. S.

CHAMBERLAIN (Weston P.). **The Health Department of the Panama Canal.**—*New England Jl. of Med.* 1930. Oct. 2. Vol. 203. No. 14. pp. 669–680. With 7 figs. & 2 charts in text.

This, if an oft-told tale, bears repetition. It is that of a colonizing experiment carried out in a region formerly notoriously unhealthy and "is a strong link in the growing chain of evidence . . . that the white race can thrive in many parts of the torrid zone provided the individual is given the protection which modern science is able to afford." In the French attempt to build the canal it is estimated that between 1881 and 1889 at least 16,000 employees died from all causes and this in a force which averaged only a little over 10,000. In 1904 the Americans took over, fortified by a treaty providing for unrestricted sanitary control by the United States, a strip of territory extending 5 miles on each side of the canal, including the cities of Colon and Panama. Between those years—1889 and 1904—two fundamental discoveries had been made, viz., the mosquito transmission of malaria and of yellow fever.

"Armed with the magic wand of mosquito control, assisted by an improved conception regarding the prevention of intestinal infections, endowed by treaty with absolute sanitary jurisdiction over a wide area, and provided with almost unlimited funds, the authorities of the United States in the year 1904 were in a position to cope effectively with the disease situation on the Isthmus, a situation which had hitherto defied control."

The health department was at first under the Governor, but in 1906 was made independent under the Isthmian Canal Commission when GORGAS was appointed a Commissioner. In 1914 the department came under the direction of a Chief Health Officer who reported directly to the Governor, and this post was held by Colonel Chamberlain from 1924 to 1929. The paper contains numerous details of the department's activities to some of which reference is here made.

Malaria prevention has been and continues to be one of the largest problems. No attempt, however, has ever been made to free the Canal Zone from malaria. Efforts are confined to the vicinity of the more important towns within which nearly all the employee population is concentrated. Native farmers are required to live at least one mile beyond the borders of the sanitated towns. The methods have varied. Jungle clearing, screening, mosquito killing, larvicides, prophylactic quinine have given place to final obliteration of mosquito-breeding areas by means of permanent drainage. Fuel oil is still used for bodies of water which cannot be obliterated, and stress is laid on treatment of malaria cases in hospital and prolonged after-treatment. The danger of shade removal is well recognized. Drainage systems now extend from one to three miles beyond the borders of the towns. Anopheles are rarely found within the sanitated areas; in Colon and Panama window screens are unusual. Details are given of the methods

of drainage. In the period 1926-28, 110,000 dollars per year was spent on antimalarial work, largely permanent or semi-permanent drainage. In the period 1921 to 1929 there were only 3 deaths from malaria in a force averaging 13,000 persons. The reduction of mortality in Colon and Panama with crowded negro population is striking. In Colon in 1906 the death rate was 51; it is now 12-14. Tropical disease figures little in the causes of death, which are headed by tuberculosis and pneumonia.

A. G. B.

CHTCHERBAKOFF (S. G.). Les maladies tropicales à Kachgar (Chine ouest). [**Tropical Diseases at Kashgar (Western China).**—*Rev. Méd. et Hyg. Trop.* 1930. Sept.-Oct. Vol. 22. No. 5. pp. 233-256.]

The area in question is part of Chinese Turkestan; it borders the U.S.S.R. on the west, Kashmir and Tibet on the south and south-east. The climate is continental with hot summers and cold winters; the air is extremely dry and rain is deficient: the altitude is over 4,000 feet. After 18 months residence the author had identified malaria, pappataci fever, dengue, sprue, beriberi, goundou, oriental sore and kala azar (in natives of India). He discusses his observations of each. Pappataci fever was diagnosed in 50 cases, all between May and September; phlebotomus was seen from the end of June to the end of July. All were cases of fever of short duration with absence of plasmodia from the blood. Five had a short relapse. Dengue was diagnosed in 23 instances between June and September but no mention is made of the mosquitoes which convey it. Two cases are described as sprue. Goundou was diagnosed in thirteen cases, some of which are described: in the majority the swelling was slight. Two cases of oriental sore with demonstration of leishmania are described; of malaria 193 cases were seen, 171 tertian, 17 subtertian and 5 quartan. Only one species of anopheles was found, *A. saccharovi*, and this is described as domestic. Fever and symptoms appear to have been slight. Of beriberi 11 cases were seen.

A. G. B.

MOUILLAC. Notes sur l'épidémiologie, l'endémiologie, la géographie, la climatologie et l'hygiène à Yunnanfou (Yunnan). [**Epidemiology, Endemiology, Geography, Climatology and Hygiene at Yunnanfu.**—*Ann. de Méd. et de Pharm. Colon.* 1930. July-Aug.-Sept. Vol. 29. No. 3. pp. 329-361.]

This article deals shortly with the diseases met with at the capital of the province of Yunnan, China, and at interesting length with those habits of the Chinese in which hygiene should play a part. [For the diseases of this region see WATSON, this *Bulletin*, Vol. 25, p. 368.]

A. G. B.

ROSKOTT (E. R. A. Luyke). De medische verzorging van het eiland Billiton. [**Medical Organization on the Island Billiton.**—*Geneesk. Tijdschr. v. Nederl.-Indië.* 1930. Nov. 1. Vol. 70. No. 11. pp. 1132-1143. With 9 figs. on 5 plates.]

The island Billiton in the D.E.I. archipelago has 70,760 inhabitants, of whom about 30,000 (chiefly Europeans and Chinese) find occupation

in the tin mining industry. The mining company has taken up the sanitary organization of the whole island. The author gives a description of this organization, working with 5 physicians, partly in two central hospitals and partly employed for sanitary and clinical work. The growth of this work since 1852 is briefly sketched and a description of the central hospitals and of the (partly ambulatory) clinics is given.

W. J. Bais.

STRAUB (M.). *Opmerkingen omtrent Immigratie en Sterfte bij de Deli Maatschappij en de "Poenale sanctie."* [**Remarks on Immigration and Mortality in the Deli Company and the "Penal Sanction."**]*—Geneesk. Tijdschr. v. Nederl.-Indië.* 1930. Nov. 1. Vol. 70. No. 11. pp. 1069-1075.

The sanitary development of the East Coast of Sumatra is without doubt chiefly due to the strict hygienic supervision of the native labour forces, possible only under the regulations of the "cool contract." Yet on a number of estates a free labour force already exists besides the indentured one.

By comparison of these population groups of the estates of the "Deli Maatschappij" the author shows:—

(1) that the mortality of the indentured labour force of the rubber estates compares favourably with that of a similar population in Europe,

(2) that on the tobacco estates the mortality in this group is about 35 per cent. higher than in Europe,

(3) that in the free labour force and their families the mortality is 75-135 per cent. higher than in Europe.

This is a strong argument in favour of the indenturing of native labour as an hygienic weapon. Yet only a part of the population draws the full benefit of it and on the other hand the patriarchal conditions of indentured labour are politically doomed to disappear. The author pleads for an altered attitude of the medical profession towards the native population, seeking *contact* instead of *contract*.

W. J. Bais.

KOUWENAAR (W.). *Policlinieken voer arbeiderskinderen ter Oostkust van Sumatra.* [**Clinics for Children of Coolies on the Plantations of Sumatra's East Coast.**]*—Nederl. Tijdschr. v. Geneesk.* 1930. Mar. 29. 74th Year. 1st Half. No. 13. pp. 1654-1656. [2 refs.] [Summary taken from *Social Sci. Abstracts.* 1931. Jan. Vol. 3. No. 1. p. 160. Signed J. J. van Loghem.]

Kouwenaar describes the measures which the sanitary service of the plantations on the east coast of Sumatra is taking against mortality among the children of the coolies. Monthly inspections have been carried out for several years. The results are as yet unsatisfactory, infant mortality ranging from 17 per cent. to 26 per cent. Recently the Deli Maatschappij started a new experiment by opening child clinics on six plantations. A special nurse every day visits one clinic, her working program being as follows: general medical inspection of all the children, weighing of the babies, treatment of skin diseases, making blood smears for malaria control. In case of disease the child is taken to the central hospital for examination by a physician; if necessary treatment in the hospital follows. After the clinical work is done, the nurse has to visit the coolies' houses for control and sanitary education. This latest sanitary measure is the first attempt of decentralization after long years of successful centralization of hygienic work on the plantations.

SONDAG (A. V. A.). Notes sur la pathologie syrienne. [**The Diseases of Syria.**]—*Arch. Méd. et Pharm. Milit.* 1930. Nov. Vol. 93. No. 4. pp. 493-513. With 2 charts in text.

The author has had 4 years' hospital practice at Aleppo. The commonest disease in that district is three-day-fever, which hardly anyone escapes. Relapses are not rare and occur at longer and longer intervals; e.g., the author had 4 attacks, the 2nd after 5 months, the 3rd after 10, and the 4th after 23. The only complications seen are asthenia and loss of hair lasting for 3 months. Several pages are devoted to malaria and its protean forms but the kind is not stated. Amoebic dysentery comes third in frequency; it has been diagnosed in nearly all cases by stool examinations, supported in doubtful cases by staining by iron haematoxylin or inoculation into the kitten's rectum. Bacillary dysentery is stated to be very rare. Amoebic hepatitis is often seen and also amoebic abscess of the lung. Pneumonia is frequent in the army owing to the presence of Malagasies and Senegalese. It is systematically treated by antipneumococcic serum injected intravenously on two successive days and the mortality is given as 5 per cent. [numbers not stated]. Aleppo button comes next. The author comments on the number of remedial agents and points out that after a year cure tends to be spontaneous. Enteric fevers are not common, thanks to vaccination. Typhus is decidedly rare and dengue unusual. The author, who had an attack of dengue, suffered from extreme hyperaesthesia of the hairy scalp.

A. G. B.

GOODNER (Kenneth) & SHATTUCK (George Cheever). **Water in Relation to the Endemic Diarrheas in Yucatan.**—*Amer. Jl. Trop. Med.* 1930. Nov. Vol. 10. No. 6. pp. 427-433. [2 refs.]

The present article is preliminary to a full report which is in preparation. It tells the story of a population living under conditions of almost total neglect of sanitation with a heavy incidence of intestinal infections. That these are not milk-borne seems to follow at once from the statement that very little milk is used in Yucatan. The water supply therefore comes under suspicion. Water is obtained largely from roof supplies but more commonly from wells. The wells are often near a cesspool and apparently receive abundant surface and soil water with little filtration. The yards of houses are used for defaecation. In the year 1924 there were in Merida, Yucatan, 646 deaths under 5 years from diarrhoea, enteritis and dysentery, to 1,075 deaths from all causes at this age period. The same proportions at all ages were 1,085 to 2,512. Bacteriological examination of water samples afforded direct evidence of high contamination. Practically every sample contained lactose fermenters, often more than 10 per cc. In a population such as this money could not be found to safeguard the wells from contamination. Preventive measures therefore should be directed to insistence on the importance of cleanliness of water containers and above all on the necessity for boiling all water.

W. F. Harvey.

CORPUS (Teofilo). **The Problem of the Campaign for the Construction of Adequate Toilets in the Control of Cholera, Dysentery, Typhoid Fever, and Gastroenteritis.**—*Jl. Philippine Islands Med. Assoc.* 1930. June. Vol. 10. No. 6. pp. 245-247.

In spite of there being laws and regulations in Manila regarding conservancy, sewage disposal, and the necessity for buildings to be

provided with privy accommodation, in the Meisic district 20.6 per cent. of thirteen thousand houses inspected had no such provision of any kind and another 53.5 per cent. used public midden sheds. It is hardly a matter for wonder, therefore, that the incidence of intestinal diseases is high. Among 129,181 inhabitants there were, in 11 months of 1929, 200 cases of dysentery with 76 deaths, 138 of enteric fever with 27 deaths, and 192 cases of "gastroenteritis," all but one fatal. [It would be interesting to know the nature of this most fatal form of gastroenteritis; was it perhaps cholera?] The remedy would seem to be obvious—to allow no buildings to be erected, or at all events used, unless adequate means of dealing with excreta are provided—but many of the inhabitants are so poor that they cannot afford even a bucket. These should be given them by the sanitary authorities. Naturally, the usual measures for control of infective diseases by the health authorities would also have to be put in action.

H. H. S.

FORT (M. A.). **A Satisfactory Sanitary Privy costing a Dollar and a Half.**
—*Southern Med. J.* 1930. Nov. Vol. 23. No. 11. p. 1037.

As a result of his experience with a rural population the author of this article found that privy risers constructed of wood rarely lasted more than twelve months and generally became dilapidated and gave rise to nuisance even before the expiration of that short time.

That a privy riser should be cheap, effective, and at the same time well nigh indestructible, and that a wooden riser is none of these things everybody with experience will agree.

The riser devised by Dr. Fort is cast in concrete. It is $1\frac{1}{2}$ inches in thickness, tapering in vertical section (internal measurements 11 inches square at the top, and 15 inches square at the bottom) and of sufficient height to permit of its passing well down below ground level.

"The wooden forms for holding the concrete for this privy riser are made of plank $\frac{3}{4}$ inch thick. First, make a central core for the form, 11 inches square at the top, 15 inches square at the bottom, 30 inches high and covered with galvanized iron sheeting, smooth. Then make four sides for the outside form. Opposite sides, 1 and 3, are 14 inches wide at top, 18 inches wide at bottom. Both top and bottom are strengthened by a flat iron strip, horizontal, which protrudes $\frac{3}{4}$ inch beyond the edge at each side. The other two sides, 2 and 4, are $1\frac{1}{2}$ inches wider than sides 1 and 3, and are made in the same way, except iron strips do not protrude beyond edges. All lined with galvanized iron sheeting. When they are stood together sides 2 and 4 lap over edges 1 and 3, forming a hollow frustum of a pyramid, 14 inches square at the top, 18 inches square at the bottom, internal measurements. The protrusions on sides 1 and 3 prevent their falling in. Two square iron hoops are made, the larger going over form down to 5 inches from the bottom, where it becomes tight. The other hoop tightens 5 inches from the top. Grease the central core and outside form and drop the assembled form over the core, mix and pour the concrete. Next day, lay 2 by 4's under opposite edges, tap central core until it drops out, loosen iron hoops, remove sides, revealing concrete riser with walls $1\frac{1}{2}$ inches thick, 14 inches square at the top, 18 inches square at bottom, outside measurements, 30 inches high.

"To make seat, 4 pieces, $1\frac{1}{2}$ inches by $1\frac{1}{2}$ inches, are cut and nailed into a square fitting snugly over top of riser; like a hat. This is floored over, the hole is cut, and the lid fastened on.

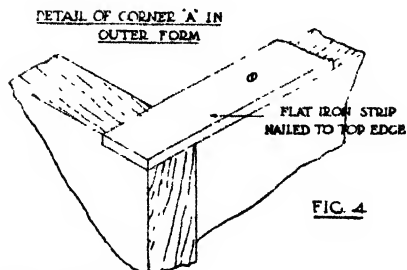
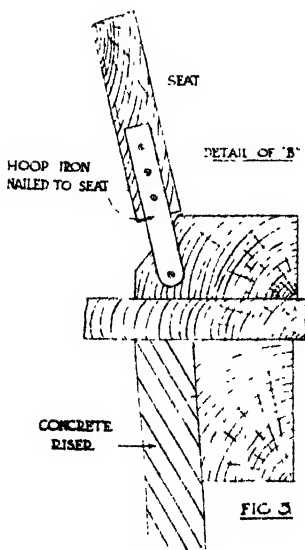
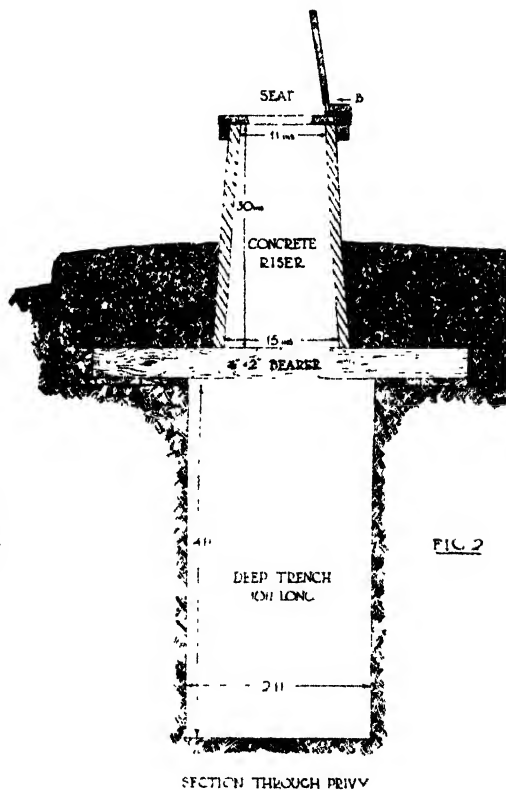
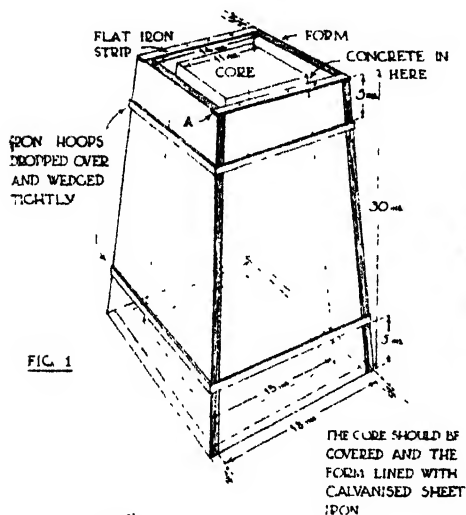
"*Installation.*—We dig a pit 10 feet long, 5 feet wide, 1 foot deep. Then we dig longitudinally in the bottom of this pit a second pit 10 feet long,

2 feet wide, 4 feet deep. (In some perfectly loose soils this pit must be curbed.) Two iron bars, iron pipe, fat rails or scantlings are placed across the deep pit and the riser placed on these. The deep pit is covered with non-rotting material, such as fat plank, rails, concrete, terra-cotta or iron slabs, or other waste material from the junk heap. Then fill in and pack dirt in shallow pit, having dirt over the entire area higher than surrounding land to shed water perfectly. The privy floor may be sand, clay, wood or concrete."

The mould is illustrated in the accompanying drawing Fig. 1 and the finished riser in situ in Fig. 2. Beyond the suggestion that the riser

MOULD FOR CASTING CONCRETE PRIVY

RISER



The "Mosaic Law" Privy.

[From drawings prepared in the Division of Public Health, London School of Hygiene and Tropical Medicine, by Mr. L. KLUTH.]

might be rendered less liable to become foul in use if the dimensions from back to front were increased to 13 inches at the top and 20 inches at the bottom, there can be little but commendation for Dr. Fort's idea.

Concrete can be made everywhere with local material, and by unskilled labour. It is claimed that this type of privy may be provided at the cost of a dollar and a half. Given the mould—in which of course any number of risers may be made—the claim is probably quite justified.

As will be seen from the drawing, Fig. 2, the riser enters 12 inches into the ground. By this means a solid footing is obtained for the bearers, a permanently sound joint secured between riser and trench, and the latter is safeguarded against surface water flooding.

A simple type of hinge for use on the seat lid is illustrated in the detail drawing, Fig. 3. The reliability of this device has been proved in practice. It is easily improvised—a piece of hoop iron and a few screws being all that is necessary for its construction.

The drawing, Fig. 4, illustrates an important detail in the construction of the outer form of the casting mould.

H. H. Clay.

BOUCHER (Humbert). Les maladies des coloniaux observées à Vichy. [**Diseases of Tropical Residents seen at Vichy.**]—*Rev. Prat. Malad. des Pays Chauds*. 1930. Nov. Year 9. Vol. 10. No. 11. pp. 521–529.

— **Tropical Diseases observed at Vichy.**—*Jl. Trop. Med. & Hyg.* 1931. Apr. 1. Vol. 34. No. 7. pp. 97–99.

The author gives figures for a period of 6 years, 1924–29, a total of 523 persons, treated at Vichy, 408 men and 115 women. The majority were from the tropics, the rest from the subtropics. Three were considered unsuited for the cure. Of the 520 17 per cent. of cases were diagnosed as malaria [no mention of the microscope], 15 per cent. as "hepatisme," 6 per cent. as dysentery, 1 per cent. as sprue. All the patients had been abroad for at least 2 years. The small figure for sprue is attributed to the progress of therapeutics and hygiene in the French colonies. Malarial patients get quinine as well as Vichy water. All appear to have done well.

A. G. B.

CASTELLANI (Aldo). **Minor Tropical Diseases.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1931. Jan. 31. Vol. 24. No. 4. pp. 379–412. With 5 plates, 4 charts & 2 text figs. [22 refs.]

The author considers his subject under the headings—Climatic Diseases—Fevers—Internal Diseases—Diseases of Organs of Special Sense—Diseases of Skin and Hair; the last occupies 28 pages. The illustrations are good. The mass of information cannot be reviewed.

A. G. B.

REVIEWS AND NOTICES.

PROGRÈS DE L'ALUMINIUM. VIII. **Sanitary Problems in Tropical Bauxite Mines.**—pp. 3–35. With 1 map & 21 figs. [1931.] Geneva: Aluminium Limited, 59 Rue du Stand. [Summary appears also in *Bulletin of Hygiene*.]

This attractive brochure is No. 8 in a series the previous numbers of which dealt with aluminium in its industrial aspects. The writer of the introduction states that Aluminium Ltd. through its subsidiary, Demerara Bauxite Co. Ltd., has developed in British Guiana a centre for the study and treatment of tropical diseases under the direction of Dr. George GIGLIOLI and Dr. Cesare ROMITI. The results of this work, he rightly says, are of interest to circles far beyond the limits of an industrial undertaking. The pamphlet consists of papers on Some general characteristics of British Guiana in relation to medical and sanitary work (GIGLIOLI); Malaria in British Guiana; its symptoms and effects (GIGLIOLI); Some observations on malaria control with special reference to conditions in the interior of British Guiana (GIGLIOLI); Important diseases in British Guiana other than malaria, such as filariasis, hookworm, and enteric fevers (GIGLIOLI); Use of bamboo in subsoil drainage (J. JACK, A.R.San.I.); The Mackenzie hospital (ROMITI); Drinking and domestic water supply at Mackenzie, British Guiana (GIGLIOLI). Naturally it contains little that is new to *Bulletin* readers. The following may be commended as a reasonable account of the benefit to labour of hookworm treatment:—

“ ‘ We started mining ore at Three Friends on the 13th of January 1923, and at that time our miners were loading 3·6 tons of ore per man per ten-hour day. At the end of 8 months' training, I find that this amount has only been increased to 5 tons per man per ten-hour day. In September 1923, you tried the carbon tetrachloride treatment for hookworm on these miners. Of course, I see no change in the tonnage mined per man in September or in October, but in November, I note that this went to 5·1 tons per man per ten-hour day; in December it increased to 5·15 tons per man per ten-hour day; in January 1924, our output per man per ten-hour day was 5·6 tons; and in February to date, our output is 6·76 tons per man per ten-hour day.’ ”

“ ‘ In the beginning of 1923, 96 miners on the ore face were mining 342 tons of bauxite per working day, whereas, on the 1st February 1924, 76 miners at the ore-face are mining 540 tons of bauxite per working day. I cannot say I attribute this increase in the output of ore per man per day entirely to the treatment which you gave for hookworm, but I do think that, to a great extent, the elimination of this disease has had something to do with our increased output and our reduction of costs. For the 5 months previous to September 1923 the increase in tonnage per man per day was nil, whereas, during the 5 months following September 1923, our increase in tonnage has amounted to $1\frac{1}{2}$ tons per man per day.’ ”

Giglioli notes that the cost of treatment per man was 0·0075 dollar.

Another worth-while quotation is this—

“ ‘ When the Mackenzie plant was being constructed, provision was made for the building of a filtration and chlorination plant to deal with the Demerara River water. The construction of this plant was actually begun, and at no mean cost. In 1923 the writer, finding that there was no reason to warrant further expense on the construction and operation of this plant, recommended that its construction should not be continued. This opinion has only been confirmed by seven years of further observation and research. . . . At Mackenzie, as conditions exist at present, the risk of contamination of the water supply is practically nil. Under the circumstances, to spend large sums of money on filtration and chlorination

equipment would be an eminently wasteful operation," with the corollary "Stereotyped sanitation, even if based on the most orthodox methods, is bound to be wasteful."

The pamphlet is attractively illustrated.

A. G. B.

CALCUTTA. Annual Report of the Calcutta School of Tropical Medicine, Institute of Hygiene and the Carmichael Hospital for Tropical Diseases 1930 [ACTON (Hugh W.), Director].—131 pp. With 1 plate & 1 chart. 1931. Calcutta: Bengal Govt. Press.

This report presents a very useful survey of the work which is being carried on in the most important overseas centre of education and research in tropical diseases. The general impression left on the reader is that the staff is engaged at high pressure and with the usual insufficiency of assistance in research of a highly important character and of wide range. A review of the manifold activities of the Calcutta School can only pick out a few points for specific notice. Fortunately it is unnecessary to do more, as most of the work done has been or is about to be published in journal form.

The investigation on filariasis, with its problems of causation and symptomatology, provides interesting reading. A rough rule is enunciated that "persons harbouring microfilariae in their blood rarely show signs of elephantiasis and conversely cases of elephantiasis rarely show microfilariae in their blood." The reason is dependent on the mode of production of the elephantiasis, for it is only so long as there is no lymphatic obstruction that microfilariae can get into the blood stream. The acute inflammatory phenomena which play so large a part in the production of changes other than mere lymphatic obstruction have been traced invariably to some septic focus and settlement of organisms in the area where locally the resistance of the tissues to infection is greatly lowered. The proof of this, more or less already known fact, is afforded by finding the same causative organism in the septic focus, in the inflammatory area and in the urine. The high incidence which may be reached in this disease and also its variability in different districts are apparent in the recorded statement of the presence of microfilariae in the blood of every third person in Cochin and in every tenth person in Allahabad. It is not the person who is suffering from elephantiasis who is a danger to the community but the commonly occurring carrier, who shows no symptoms at all.

Epidemic dropsy is contrasted with beriberi in its relation to rice eating. The former is not a deficiency disease and is not curable by administration of vitamin B preparations, but may be prevented if care is taken that the rice eaten is not diseased.

Spirochaetal infections have been specially investigated and perhaps the most important pronouncement in this case, with avian spirochaetosis and its cause *Spirochata anserina* as exemplification, is that no ultra-minute and invisible granule or spore phase is evident in the life history of these spirochaetes. "Hereditary transmission occurs in the tick probably through the entry of very minute spirochaetes into the ova *in situ*. In the tick transmission is usually via the salivary glands and the tick bite is infective; the tick is also extremely infective if swallowed."

Two further points in this interesting survey of the year's work may be referred to briefly. The first of these relates to research on ringworm fungi and may possibly have a wide application in this group of infections—"The different lesions due to dhobie itch (*Tinea cruris*) are all due to one fungus which varies in colour and morphological appearances." The second is a simple note of a useful microscopic method for the differentiation of skin diseases instead of the caustic potash clearing method. The stain has the composition:—toluidin blue 1; acetic acid 2; absolute alcohol 4; water 100. A few drops are placed on the test scales or the bit of skin

and a cover glass applied. If the material is too deeply stained the cover glass is lifted off, excess of stain removed by blotting paper, and a few drops of glycerin added to clear the tissue, by which means the character of the scales and the presence of fungi are demonstrable under high powers.

Various reports are included in this publication from the different departments which go to make up the School of Tropical Medicine, the Institute of Hygiene, the research sections and the Carmichael hospital.

W. F. Harvey.

GHOSH (Birendra Nath) [F.R.F.P. & S. (Glasg.), etc.]. **A Treatise on Hygiene and Public Health with Special Reference to the Tropics.** Revised and largely rewritten with the Advice and Assistance of A. D. STEWART [M.B., etc.]. Seventh Edition.—pp. xxvi+728. With 149 text figs. 1930. Calcutta: Scientific Publishing Co. [Rs. 6-8 or 10s. 6d.] [Review has appeared also in *Bulletin of Hygiene*.]

Since the first issue of this work under the joint authorship of Dr. B. N. Ghosh and Dr. J. L. DAS in 1912, there has been a new edition on an average every 3 years, the seventh being published in October 1930. Dr. Ghosh has alone been responsible for the last three issues. A work so successful as this calls for little in the way of review; the steady issue of new editions is of itself sufficient evidence of its worth. Opportunity has been taken to bring the subject up to date, but by judicious cutting down of old material the author has been able to make several important additions and improvements without increasing unduly the size of the book, which remains a manual in the English sense of the term. The whole has been increased by 60 pages, and by the incorporation of 27 new diagrams; nevertheless the price has been kept the same as before. The chief changes from the sixth edition consist in an inclusion in Chapter V of an interesting account of the Physical Geology of India; in Chapter XVI a section on Heredity and Eugenics has been added, and in Chapter XXI Trypanosomiasis and Dysentery, which were absent from previous editions, have now been included and some additions have been made to the chapter dealing with animal parasites. Lastly, the chapter on Vital Statistics has been rewritten and the terminal chapters have been rearranged so that Village Sanitation and the Sanitation of Fairs and Religious Festivals now precede that on Vital Statistics which fitly ends the volume. The author is to be congratulated on so ably incorporating new work without increasing to any appreciable extent the size. Due acknowledgment is made to Major G. COVELL, I.M.S., of the Malaria Survey of India, who has rewritten the part dealing with Malaria, and to Colonel A. B. FRY, I.M.S. (retd.), and Lt.-Colonel A. D. Stewart, I.M.S., for their help in the revision.

H. H. S.

VAN ASSENDELFT (F.). **Impfmalaria.** [Induced Malaria.]—*Beihefte z. Arch. f. Schiffs- u. Trop.-Hyg.* 1931. Vol. 35. No. 1. pp. 1-104 (1-104). With 62 text figs. 1931. Leipzig: J. A. Barth.

An academic thesis for the degree of doctor of medicine at Amsterdam University. It is a clinical study of 350 cases of induced benign tertian malaria in patients who underwent malariotherapy in mental hospitals in Amsterdam. The infection was induced by the direct inoculation of blood subcutaneously or (in a few instances) intravenously. Charts of temperature and parasite counts in six cases infected by mosquito bites are also given. The author states that in preparing the thesis he was assisted by Professor SCHÜFFNER and Dr. P. C. KORTEWEG, who had previously studied many of the cases. The principal observations recorded are concerned with (1) the duration of the incubation period, (2) the "injection

fever," which occurs shortly after inoculation, (3) the "initial fever" which, in primary cases, ushers in the onset of the malarial attacks, (4) the type of fever (quotidian or tertian) of the malarial attack. KORTEWEG's description of the initial fever and of the resemblance between the type of fever in the donor and recipient are confirmed as well as his observation that asexual parasites in all stages of development can be found in "thick drop" preparations of blood taken during the incubation period before the first rise of fever. The "pyrogenic limit" of parasites is very different in different cases and at any given period of the malarial attack it is difficult to correlate the parasite count with the height of the fever. Absence of relapses is the chief difference between inoculated and natural malaria and the view that there are strains of inoculated malaria without sexual forms of the parasite in the blood is not in accordance with experience in Amsterdam.

S. P. James.

VAN CLEAVE (Harley Jones) [Professor of Zoology, University of Illinois]. **Invertebrate Zoology**. Second Edition.—pp. xiv+282. With frontispiece & 126 text figs. 1931. London & New York: McGraw-Hill Book Company, Inc. [\$3.00.]

Of the 261 descriptive pages of this volume 211 are assigned to invertebrate animals and 50 are occupied with certain generalities of wider range, such as classification, cell and tissue differentiation, reproduction and the beginnings of the embryo, and phylogeny. Of the 211 pages 120 are allotted to the four groups or phyla that come within the special range of this *Bulletin*, namely Protozoa (39 pp.), Platyhelminthes (22 pp.), Nematelminthes (9 pp.), and Arthropoda (50 pp.). In the treatment of the subject a general account is given of each phylum and of each of its constituent Classes and sub-classes, typical forms—adult or larval—and characteristic structures are described and perhaps figured in illustration, and the taxonomy of the phylum is outlined in a synopsis that comprises nutshell definitions of Orders with bare names of their representative genera.

In the chapter on Protozoa the concept of the single self-centred animal cell, with some compromising holophyte connexions, yet with some Metazoan aspirations (shown in purposeful agglomerations and slightly differentiated colonial forms, differentiated gametes, and differentiation of the cell-plasm to form organidia) is instructively considered. In the 26 text-figures of characteristic forms six of those parasitic in man appear, and are briefly noticed. What is wanting is a little guidance towards natural sources of material and in technical methods of studying this so variously attractive crowd of animalcules.

In the two chapters allotted to the Platyhelminthes and Nematelminthes the familiar life-histories of the liver-fluke and the ox-tapeworm are described, and *Ascaris* and hookworm and the notorious *Trichinella* are brought forward. But from both groups there are many important omissions, whether the design of the book be educative or merely informative. Among striking omissions are the discovery by JANICKI and ROSEN of the procercoid stage of the ribbon worm in the wide-ranging *Cyclops strenuus* (and another Cyclopidae) and of the subsequent plerocercoid stage in certain freshwater fishes, and so, at last, the completion of the life-cycle of *Dibothriocephalus latus*; the dissolution by OKUMURA, YOSHIDA, and others of the perplexing "genus" *Ligula* in larval stages of *Dibothriocephalus*; FEDSHENKO's discovery of the intermediation of Cyclops in the larval development of the guineaworm; and MANSON's discovery of the larval history of *Filaria bancrofti* in certain house-haunting mosquitoes—a discovery which, although criticized at the outset and then left in limbo for many years, at length, in MANSON's fostering care, worked like the leaven which the woman of the Scriptures took and hid in three measures of meal.

The Arthropoda are confined within fifty pages, of which Crustacea take twenty and Insects are rather hardly treated in seventeen, all that is diffidently proffered on the importance of insects in Nature and in human affairs barely filling one page, though for this laconic necessity the author is apologetic.

It is not easy to place this book. It does not carry much farther than the elements of zoology, and yet the author states that "an introductory course in college zoology is assumed as a pre-requisite to a course for which this book is designed as a text." It does not lend any special impetus to the practical applications of zoology; nor on the other hand does it particularly point the way to those interesting biological and philosophic studies that show the priceless value of zoology in the real education that leads Man to knowledge of himself and his place in Nature. The book may be described without any intended disparagement as a good compendium that will be appreciated by men who are preparing to meet that incalculable abstraction, the examiner.

A. Alcock.

NÖLLER (Wilhelm). **Die nächsten Verwandten der Blutflagellaten und ihre Beziehungen zu den blutbewohnenden Formen.** [The Nearest Relatives of the Blood Flagellates and their Connexions with the Blood Forms.]—*Handbuch der Pathogenen Protozoen.* (Prowazek-Nöller.) 1931. Bd. III. Lief. 13. pp. 1969–2143. With 28 text figs. Index to Bds. I–III. pp. 2144–2171. 1931. Leipzig: J. A. Barth. [32 Rm.]

In 1911 was issued the first part of a treatise on the pathogenic protozoa under the editorship of Professor S. von PROWAZEK, who saw the completion of the first volume in 1912 and two parts of the second in 1912 and 1914. His death from typhus fever during the War and the conflict itself interrupted the issue for six years, the third and final part of the second volume not appearing till 1921 under the editorship of Professor Wilhelm Nöller. Three further parts were published in 1921, one in 1925, and another in 1928, and now the thirteenth part completes the treatise which has covered a period of twenty years. It will be evident that the various parts, written by different authors, one of whom was Karl BELAR, whose recent death as the result of a motor accident is such a serious loss to protozoology, are of very unequal worth from the present day point of view, the earlier ones being more of historical than of any other value. The twelfth part was by Professor Nöller, and dealt with the cultivation of parasitic protozoa, while the final part now being considered is by the same author and discusses the nearest relatives of the blood flagellates and their relationship to the blood-inhabiting forms. Under this title the author first deals with various intestinal flagellates such as *Trichomonas*, *Hexamita*, and *Lambliia*, which may occur in the blood stream, invasion having taken place shortly before or after death of the host; next with the Bodonidae including *Bodo* and *Prowazekia* which appear coprozoically in faeces and possibly in the intestine itself and *Cryptobia* and its allies *Trypanophis* and *Trypanoplasmodoides* which are parasitic in invertebrates, chiefly molluscs, or in the intestine and blood of fish; and finally with the *Herpetomonadidae* which embrace all the flagellates commonly known as insect flagellates, leishmania and trypanosomes.

The book covers very much the same ground as similar articles which have appeared in several text books in recent years, and it is evident that these have been consulted and to a large extent followed. The general arrangement is inevitably the same but the author has introduced modifications of his own, as for instance in the classification where a series of sub-genera has been established. Of the *Herpetomonadidae*, the account of which occupies the bulk of the book, there are three main divisions, viz.: forms without undulating membrane (*Leptomonas* and *Herpetomonas*),

forms with rudimentary membrane (*Rhynchoidomonas* and *Cystotrypanosoma*) and forms with completely developed membrane (*Crithidia* and *Trypanosoma*). The genus *Leptomonas* includes the sub-genera *Leptomonas*, *Phytomonas* and *Leishmania* together with *Cercoplasma*, the position of which in the scheme of classification adopted seems anomalous as members of the sub-genus possess both leptomonad and trypanosome stages. The genus *Herpetomonas* is based chiefly on the tendency of the house fly flagellate to possess two flagella, though most authorities consider that the bi-flagellate condition merely indicates that division is in progress. The position in an intermediate group with rudimentary membrane of *Rhynchoidomonas* and *Cystotrypanosoma* raises questions which cannot be discussed here. It will be sufficient to state that both these include forms which are essentially trypanosome in type, while the latter has representatives which are supposed to undergo encystment, a feature originally attributed by MINCHIN to *Trypanosoma grayi*. In the case of this trypanosome it is now known, from the work of HOARE, that the supposed cysts are merely artefacts, an observation which throws considerable doubt on the validity of the genus *Cystotrypanosoma*, the establishment of which by ROUBAUD was based largely on the supposed cysts of *Trypanosoma grayi*. It is far from clear why the author did not include in this intermediate group *Cercoplasma* with its trypanosome stages. It must be admitted, however, that the affinities of these purely insect flagellates with both leptomonad and trypanosome stages are very obscure. In the third group are *Crithidia* and *Trypanosoma* with sub-genera *Schizotrypanum* and *Endotrypanum* and here the author is on firmer ground. It is noted that certain flagellates previously regarded as *Crithidia* in insects have been shown to be insect phases of vertebrate trypanosomes and that the retention of the genus is only justified by the fact that in many cases a trypanosome phase has not yet been discovered.

The trypanosomes proper are considered from the point of view of their transmission and those of fish, amphibia, reptiles, birds and mammals are discussed separately. The trypanosomes of mammals again are described in sections determined by the invertebrate transmitter rather than by the type of development followed by them. Thus there are sections devoted to bug-transmitted trypanosomes, flea-transmitted trypanosomes, tsetse-transmitted trypanosomes and so on, while the case of *Trypanosoma equiperdum*, in which no insect is involved, is considered separately. In the last section the origin of trypanosomes is discussed and the conclusion is reached that the view enunciated by LÉGER in 1902, that they have sprung from original insect flagellates, is the correct one. Considerable space is devoted to refutation of the theory first put forward by MINCHIN in 1908 that the blood-inhabiting trypanosomes may have originated from intestinal flagellates of vertebrates, the author evidently being unaware that MINCHIN himself subsequently reverted to LÉGER's hypothesis.

Such, in brief outline, is the subject matter of the book which, though possibly open to criticism from the point of view of classification and a few minor details, maintains a high standard throughout as regards accuracy of detail and clearness of exposition. The illustrations are adequate, while a series of lists of insect and other flagellates and their hosts is of value for purposes of reference. There are forty pages of bibliography and a short appendix dealing with publications which appeared too late for reference in the main text, which was completed in December 1930. The author is to be congratulated not only for having produced an excellent account of the trypanosomes and allied flagellates, but also for bringing to a successful conclusion Prowazek's handbook of pathogenic protozoa and in removing a constant source of annoyance by supplying an index to the thirteen parts which make up the three volumes.

C. M. Wenyon.

BUREAU OF HYGIENE AND TROPICAL DISEASES.

TROPICAL DISEASES
BULLETIN.

Vol. 28.]

1931.

[No. 10.]

AMOEBIASIS AND DYSENTERY.

AMOEBIASIS.

BIGGAM (A. G.). **Acute Amoebic Dysentery and Amoebic Ulceration of the Small Intestine.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1930. Nov. 25. Vol. 24. No. 3. pp. 347-350. [4 refs.]

A valuable and complete description of two cases of acute amoebic dysentery, demonstrating that history alone cannot be relied on, for in both cases an acute and sudden onset with no previous history of dysentery and rapidly fatal termination despite antamoebic treatment, suggested rather a bacillary infection. In Case No. 1 scanty entamoebae were found on microscopic examination of the fresh stool; but in Case No. 2 none were found after repeated stool examination, the diagnosis was established only after sigmoidoscopic inspection had revealed typical amoebic ulcers, from a scraping of one of which large numbers of actively motile *E. histolytica* were recovered. The author points out that when a bed-pan specimen only is examined, repeated negative microscopic results cannot always definitely exclude an acute amoebic infection. The autopsy finding of healthy mucous membrane between the amoebic ulcers proved that the cases were pure amoebic, and not mixed amoebic and bacillary infection. The author points out further that involvement of small intestine in these two cases is at variance with the generally accepted view that amoebic ulceration rarely if ever extends above the ileo-caecal valve.

H. M. Hanschell.

GHARPURE (P. V.) & SALDANHA (J. L.). **Some Observations on Human Amoebiasis. (Being an Analysis of Post-Mortem Findings in 426 Cases.)**—*Indian Med. Gaz.* 1931. Mar. Vol. 66. No. 3. pp. 132-135. With 2 graphs in text. [1 ref.] [Grant Med. College, Bombay.]

The series comprises 169 cases with hepatic lesions, and 257 with intestinal lesions only and is the result of the authors' first hand experience during five years conducting of a large number of detailed autopsies in Bombay, and their analysis of the postmortem records of the last 40 years at the Grant Medical College. They point out that cases for autopsy from the children's hospital are rare.

The paper is necessarily a catalogue of data—forbidding any useful summary. The two tables here given may serve as some indication of the paper's scope.

Age Incidence.		Percentages.	
Age.	Amoebic dysentery. 257 cases.	Liver abscess. 169 cases.	Total. 426 cases.
Below 10	0.9	0.0	0.6
11 to 20	12.5	6.1	9.6
21 to 30	32.8	37.0	33.3
31 to 40	28.5	39.8	32.6
41 to 50	17.4	9.7	15.6
51 to 60	4.8	6.0	5.6
61 to 70	2.7	0.7	2.1
71 to 80	0.4	0.7	0.6

Sex Incidence.		Percentages.	
Sex.	Amoebic dysentery. 257 cases.	Liver abscess. 169 cases.	Total. 426 cases.
Male	90.6	97	93.8
Female	9.4	3	6.2

H. M. H.

FAUST (Ernest Carroll). **The Incidence and Significance of Infestation with *Endamoeba histolytica* in New Orleans and the American Tropics.**—*Amer. Jl. Trop. Med.* 1931. May. Vol. 11. No. 3. pp. 231-237. With 2 text figs. [16 refs.] [Gorgas Memorial Lab., & Dept. of Trop. Med., Tulane Univ. of Louisiana, New Orleans.]

The Charity Hospital and Boys' Home groups in New Orleans comprise approximately 1,000 individuals, and the Santo Tomas Hospital and Chagres River Villages groups in Panama 2,000 individuals. This tabular summary shows the significance of diagnosing those cases in which only cysts are passed as contrasted with those in which active trophozoites are seen. In the most heavily infested communities (including those in which acute dysentery in the native population is uncommon) cysts are much more common than trophozoites. This suggests a developing racial tolerance to the parasite. Populations with a high incidence usually have a heavy infestation and vice versa. Therefore a person with a heavy infestation from a lightly infected (non-immune?) group is more likely to develop an acute amoebic colitis than one of a similarly high amount from a highly parasitized group. In heavily infested individuals in a population with a high incidence the evidence favours the view that *E. histolytica* is, in the

Population groups.	Every examination positive.	Two out of 3 examinations positive.	Only first or second examination positive.	Only third examination positive.	Positive only after 3 examinations.	Cysts only.	Trophozoites only.	Cysts and Trophozoites.
	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.
Charity Hospital New Orleans	10.5	42.1	31.6	10.5	5.3	42.1	26.3	31.6
Hope Haven Boys' Home	55.5	11.1	33.3	0.0	0.0	100.0	0.0	0.0
Hospital, Santo Tomas	15.3	19.1	41.2	16.8	7.6	47.3	22.9	29.8
Chagres River Villages	14.8	29.0	31.4	24.8	0.0	90.9	2.4	6.6

great majority of cases, essentially in complete equilibrium with the host tissue, and in some cases possibly not a tissue parasite at all, but, like this organism in certain species of monkeys, is a commensal, feeding only on starch, bacteria and mucous secretions of the large bowel.

H. M. H.

ANDREWS (Justin) & PAULSON (Moses). **The Incidence of Human Intestinal Protozoa. With Especial Reference to *Endamoeba histolytica*, in the Residents of the Temperate Zone.**—*Amer. Jl. Med. Sci.* 1931. Jan. Vol. 181. No. 1. pp. 102-106. [14 refs.] [School of Hyg. & Public Health, Johns Hopkins Univ., & Johns Hopkins Hosp. & Med. School, Baltimore.]

A survey of human intestinal protozoa with especial reference to *E. histolytica* among adults residing in their ordinary homes in a large city, Baltimore, who appeared at an outpatient clinic seeking relief from gastro-intestinal symptoms. In 522 cases studied, the total incidence of human protozoa infesting the intestinal tract was 10.9 per cent.; by species: *E. histolytica* 0.2 per cent. (one case); *E. coli* 4.2; *Endolimax nana* 2.5; *Iodamoeba williamsi* 1.3; *Trichomonas hominis* 2.1; *Chilomastix mesnili* 1.3; *Giardia lamblia* 2.7; and *Embadomonas intestinalis* 0.2 per cent.

[The low incidence of *E. histolytica* is especially noteworthy.]

H. M. H.

CASTELLANA (Antonio). Contributo alla epidemiologia e profilassi della amebiasi in Palermo e Sicilia. [**Epidemiology and Prophylaxis of Amoebiasis in Sicily.**]—*Riv. Sanitaria Siciliana*. 1931. Apr. 1. & 15. Vol. 19. Nos. 7 & 8. pp. 475-8, 481-4, 487-90; 555-8, 561-4, 567-9. English summary. [61 refs.] [Hyg. Inst., Univ., Palermo.]

The existence of amoebic dysentery in Sicily has been noted since 1912, but there has been marked increase of notifications in recent years; 29 in 1928, 77 in 1929, 151 in the first nine months of 1930, at Palermo. This is due, at least in part, to greater knowledge of the infection and more attention being given to it by sanitarians. A large proportion of the patients are children; 118 cases were treated at the Children's Clinic between 1927 and the beginning of 1930, and 84 of

these were below 2 years. The disease is not localized ; 26 districts in the Province are named as furnishing cases.

The causes for prevalence of dysentery are stated to be the fertilization of vegetables with human excreta, the fact that vegetables and fruit are commonly eaten raw, that there is no proper sewage system beyond a series of badly kept canals, that the water supply is not beyond reproach and that domestic hygiene is at a discount. Many of the patients were found living in small and dirty dwellings so that actual direct contact was probably the cause of many cases. It is not surprising that enteric is even more rife than dysentery. Many of the houses had cats, another likely intermediary, but the few examined were not proved to be cyst-passers. From a table giving the monthly returns of notifications and deaths from amoebic dysentery and of deaths from " enteritis, gastro-enteritis and dysentery not-specified " for the 3 years 1928-30 it is seen that June-August is the time of greatest prevalence and flies undoubtedly play no small part in disseminating infection. Prophylactic measures are obvious and need not be detailed.

H. H. S.

GOURVIL. Epidémie de dysenterie amibienne observée dans la garnison de Libourne. [**Epidemic of Amoebic Dysentery in the Libourne Garrison.**]*—Ann. de Méd. et de Pharm. Colon.* 1930. Apr.-May-June. Vol. 28. No. 2. pp. 235-243. [2 refs.]

A description of an outbreak of dysentery near Bordeaux in European and non-European troops (Senegalese and Malagasies). The author notes that the epidemic character of the outbreak at first suggested bacillary dysentery : a suggestion supported indeed by the clinical features—high fever, great prostration, very frequent sero-sanguineous bowel evacuations—of some of the cases. However the diagnosis of amoebic dysentery was reached and maintained on finding in the stools of every patient cells, 30 to 35 μ , showing distinct endo- and ectoplasm, and in the endo-plasm numerous red blood cells. The ecto-plasm protruded pseudopodia. [No description of nucleus given ; and all doubt as to the amoebic nature of these cells is not dispelled.]

H. M. H.

GERBASI (M.). Osservazioni e ricerche sulla amebiasi nei lattanti. [**A Study of Amoebiasis in Infants.**]*—Pediatrics.* 1931. Jan. 15. Vol. 40. No. 2. pp. 65-95. With 4 graphs in text. [11 refs.] [Inst. of Clin. Pediatrics, Univ., & G. di Cristina Children's Hosp., Palermo.]

The author notes the number of cases of amoebiasis attending the Institute between 1922 and May 1930, namely 151, of which 63 were below 12 months of age. He deals with 50 of the latter. Conclusions founded on so small a number must of necessity be received with caution. Epidemiologically, the disease would appear to be widespread in Sicily since patients were brought from districts far apart. It is worthy of note that amoebic hepatitis was not found in any case, and that a frequent and much dreaded complication was a meningo-encephalitis, practically always fatal. The author remarks that urinary amoebiasis may persist as the sole localization of the infection, but that this fact does not make the prognosis any more grave.

H. H. S.

REVUE DE MÉDECINE ET D'HYGIÈNE TROPICALES. 1930. Nov.-Dec.
Vol. 22. No. 6. pp. 268-312.—Amibiase. [*Amoebiasis*.] [9 papers.]

These nine papers by various authors on amoebiasis record much that is the accepted commonplace knowledge of amoebic infection and much more—e.g., “typhlite amoebienne aiguë”; and “troubles nerveux réflexes,” and “manifestations d'ordre neuro-psychiatrique”—the amoebic origin or causation of which is claimed: but the claim is not made out to anyone who trammels a clinical fancy by tested and controlled evidence.

H. M. H.

i. PANAYOTATOU (Angélique). Quelques remarques encore sur l'“amibiase extra-intestinale.” [*Extra-Intestinal Amoebiasis*.]—*Rev. Prat. Malad. des Pays Chauds*. 1930. Nov. Year 9. Vol. 10. No. 11. pp. 501-507. [7 refs.]

ii. FARMAKIDIS (C.). A propos de l'amibiase extra-intestinale.—*Ibid*. pp. 508-511.

i. A brief summary of the dicta [still unfounded on parasitological proof, which is not noted by the author] of various authors in favour of the thesis that the amoeba may spread all over the body and may infect most organs. A thesis the author confirms from her experience in Alexandria.

ii. Professor Farmakidis ranges himself alongside Dr. KHOURI in insisting on the necessity of rigorous scientific proof for the existence of amoebic bronchitis and urinary amoebiasis in Alexandria. During three years among a large number of patients at his hospital none of such cases have been found. Moreover in those amoebic dysentery patients who presented signs of bronchitis or urinary symptoms, search in the sputa or in the urine, respectively, never revealed the amoeba.

He cites two cases, diagnosed by colleagues as “amoebic bronchitis” on the strength of temporary relief of symptoms following emetine treatment. One was found to have heart disease with pulmonary congestion and consequently haemoptysis: the other a pulmonary cavity with many tubercle bacilli in sputum.

H. M. H.

BARROW (John V.) with the collaboration of Stacy WOODARD.
A Study of Human Amebiasis by Means of the Motion Picture.—*Jl. Amer. Med. Assoc.* 1931. Jan. 17. Vol. 96. No. 3. pp. 167-170. With 16 text figs.

The application of the moving film to microscopy must one day make real Dr. Barrow's confessed desire to have the medical profession observe the human amoebiasis as plainly as he has seen it. The illustrations to this paper are excellent, though still, samples from the amoebiasis motion picture. A study of the whole picture has revealed plainly the morphological and bionomical characteristics of *E. coli* and *E. histolytica*. The value of such a film for teaching purposes is obvious.

H. M. H.

HONNA (F.). **Appendicitis caused by *Endamoeba histolytica*.**—*Taiwan Igakkai Zasshi (Jl. Med. Assoc. Formosa)*. 1930. Dec. No. 309. [In Japanese. English summary p. 87.] [Govt. Hosp., Taihoku.]

The author notes that although cases of appendicitis in the course of amoebic dysentery have been recorded, yet true appendicitis caused by *E. histolytica* seems to be very rare; only HOGAN has reported one undoubted case with positive proof of the amoeba and with good illustrations. In the author's case the appendix after removal showed small ulcers on its internal surface. Histological examination revealed typical ulcers of mucosa and submucosa and numerous *E. histolytica* in these tissues. Among 739 appendicectomies in the last 9 years this case was unique although amoebic dysentery is frequent in the district.*

H. M. H.

SNYDER (J. W.). **Liver Abscess.**—*Southern Med. Jl.* 1931. June. Vol. 24. No. 6. pp. 497-503. With 1 text fig. [19 refs.]

The author suggests that while aspiration alone is the method of choice for the tropics, where there is extensive experience of liver abscess, yet where liver abscess is rare, diagnosis is difficult and an exploratory operation a valuable aid to diagnosis and a means of avoiding unfortunate errors; e.g., to plunge an aspirator into an indefinite swelling in epigastrium would be surgically unsound. Among his cases, here quoted, is one illustrating the ease with which an abscess in posterior portion of liver can be drained by anterior approach. A long drainage tract was burnt (cutting cautery) through healthy liver. Autopsy twenty-five days later revealed abscess cavity and tract so nearly healed that the liver itself appeared normal, scar tissue being extremely small.

H. M. H.

CASONI (Tommaso). Sulla cura medica dell' ascesso epatico amebico. [**Medical Treatment of Amoebic Abscess of the Liver.**]—*Polichinico. Sez. Prat.* 1931. Feb. 9. Vol. 38. No. 6. pp. 183-189. [Vittorio Emanuele III Colonial Hosp., Tripoli.]

The author records four cases, one in full detail, three more briefly; in one the patient was *in extremis* and the abscess apparently pointing, with oedema of the chest wall, and a priest had administered the last rites. Amoebic pus was proved by exploratory puncture in one, and the physical signs in all were unmistakable. Intensive treatment with emetine hydrochloride subcutaneously, 12 cgm. daily, and in one case 16 cgm. the first day in 4 doses, was followed by cure in all. They have been followed up, one for 1 year, one for 7 years, the others for "several years," but none has shown any signs of relapse.

The author maintains, therefore, that neither the gravity of the condition nor the size of the abscess are contraindications to medical treatment and judging from 25 cases observed by him he is confirmed that the only indications for surgical measures are the presence of bacteria in the fluid obtained by exploration (that is, in a condition not purely amoebic) and perforation into pleura, pericardium or peritoneum.

H. H. S.

* See also this *Bulletin*, Vol. 25, p. 620 (BA CHOW).

WILLOUGHBY (Hugh) & ASLETT (Edward). **The Treatment of Amoebic Dysentery and its Complications.**—*Jl. Roy. Nav. Med. Serv.* 1931. Jan. Vol. 17. No. 1. pp. 19-26. With 1 text fig. [Hosp. for Trop. Diseases, London.]

In this careful concise summary of the subject the authors point out that amoebic dysentery treated solely with injections of emetine hydrochloride is not radically cured; relapses occur usually within twelve months. Emetine hydrochloride injections should not be given oftener than once daily and 10 injections (1 grain each) constitute a full course. Its use should be limited to cases where immediate hospital treatment is not available—i.e., first aid measure, or during acute dysenteric symptoms, or where abscess formation in liver or elsewhere is threatened or suspected and severe hepatitis exists. For the above purposes two or three injections should be sufficient—after which hospital treatment should be instituted: viz., bed, light diet, emetine bismuth iodide (E.B.I.) (26 per cent. emetine alkaloid) per os, 1st night 1 grain, 2nd night 2, 3rd and subsequent nights 3, up to a total in 10 days of 27 grains. More than one course may be needed in the relapsing cases: E.B.I. is highly toxic, and must not be given unless the patient's cardiac condition is good.

Emetine periodide is much less toxic, should be given when E.B.I. is not tolerated, and is especially suitable for women patients. The dosage is 2 grains twice daily for twelve days.

Stovarsol alleviates diarrhoea; 4 grains twice daily by mouth produces tonic effect; and is especially useful for after treatment during convalescence.

Yatren 105 can be given orally, by enema, subcutaneously, or intravenously. 0.5 gram t.i.d. per os for 10 days is normal course for an adult, to be repeated after a week's interval. In pill form yatren acts best as an after treatment or when acute symptoms have been controlled by other means. The best method of administering it is by rectal enema—10 oz. of a 2½ per cent. solution preceded an hour earlier by 1 pint enema of 2 per cent. solution of sodium bicarbonate. The yatren enema is retained for 5 to 8 hours. Yatren enemata daily for 10 days given in combination with E.B.I. is the best treatment for amoebic dysentery. Out of 150 cases so treated the authors noted but one relapse.

Complications: Amoebic hepatitis is treated by injections of emetine hydrochloride. If abscess formation be suspected exploratory aspiration must be undertaken. If pus be located aspiration should continue until all pus is evacuated; after-treatment by thorough course of E.B.I. and yatren.

H. M. H.

MATTEI (Charles). De l'emploi de l'émétine dans le traitement des suppurations pulmonaires en dehors de l'amibiase caractérisée. [**Employment of Emetine in Treatment of Pulmonary Suppuration, Amoebiasis Apart.**—*Rev. Méd. de France et des Colonies.* 1930. May. Vol. 7. No. 5. pp. 167-196. With 1 chart in text. [3 pages of refs.]

An interesting paper in which the author discusses the matter very fully and gives clinical records of illustrative cases. In the end he concludes [necessarily] lamely that there are certainly cases of pul-

monary suppuration of disputable amoebic origin which emetine has rapidly cured. Among these of doubtful origin, some have run an acute course: and it is difficult to attribute their cure solely to emetine. The cure of chronic cases is in favour of some definite action of emetine. But it has not been proved that these cases were not in origin amoebic—although one must be cautious about accepting primary extra-intestinal amoebiasis.

On the other hand, in those cases of pulmonary suppuration where, so far as is possible, amoebic origin could be excluded, emetine has not been appreciably successful. Temporary improvements do not denote any particular effect of emetine, for chronic pulmonary suppurations have periods of remission. Nevertheless in doubtful cases it is the clinician's duty always to try "un traitement d'épreuve par l'émétine."

H. M. H.

REED (Alfred C.). **Emetin and the Treatment of Amebic Colitis.**—*Amer. Jl. Med. Sci.* 1931. Apr. Vol. 181. No. 4. pp. 553-560. [4 refs.] [Pacific Inst. of Trop. Med., Univ. of California, San Francisco.]

The author notes that emetine poisoning shows itself clinically in three chief syndromes: in the gastro-intestinal tract, in the nervous system and in the circulatory system. Deaths have been reported from its effects on the circulatory system. In addition there may be severe local reaction to its hypodermic injection, e.g., sloughing from its intramuscular injection, and a definite cumulative action must invariably be remembered. It is a powerful, dangerous and valuable remedy whose complete action is not yet known. The treatment of intestinal amoebiasis must cover a sufficient duration of time, irrespective of symptoms. The total amount of emetine given in one course must not exceed 0.010 gm. per kilo of body weight.

[The author appears unaware of the experimental observations of YOUNG and TUDHOPE (this *Bulletin*, v. 24, p. 13). They showed that emetine "neuritis" was in fact a myositis.]

H. M. H.

RONNEFELDT (F.). Amöbenruhrbehandlung mit Rivanol. [**Treatment of Amoebic Dysentery with Rivanol.**]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1931. Mar. Vol. 35. No. 3. pp. 176-180. [4 refs.]

The author records the results of rivanol treatment in 14 cases (1 white child, 1 Syrian, 12 negroes) of amoebic dysentery. Five were severe cases, the rest slight. One of the severe cases died. The rest made apparent good recoveries. The author noted the marked antispasmodic value of rivanol. He does not claim these observations on 14 cases sufficient to warrant conclusions as to how long they will remain amoeba-free, or as to the effect of rivanol on liver complications.

H. M. H.

PANAYOTATOU (A.). L'amiphène contre les affections dysentériques. [**Amiphene for Dysentery.**]—*Bull. Soc. Path. Exot.* 1931. Jan. 14. Vol. 24. No. 1. pp. 28-34.

The author cites from her practice 10 cases, acute and chronic, of colitis; claimed to be due to an infection with *E. histolytica* on finding amoebae

and/or cysts in the stools; and further, clinical and parasitological cure claimed by treating the cases with amiphène, in cachets by mouth. Eight of the cases, however, were given emetine injections as well.

H. M. H.

HOLDER (Hall G.), OSBORNE (Clyde J.) & SOMMERMEYER (Viola). **Diathermy in the Treatment of Amebiasis. Report of a Case.**—*California & Western Med.* 1931. Mar. Vol. 34. No. 3. pp. 189-190. With 3 text figs. [2 refs.]

Sigmoidoscopy revealed numerous small discrete ulcerations with grayish white base; mucosa markedly injected and dotted with numerous punctate haemorrhagic areas. It is stated that the patient had been ill for two months with amoebic dysentery and that he had apparently become drug fast. *E. histolytica* was found in the stools. Rectal diathermy was given, maintaining a temperature in rectum of 110°-114° F. for twenty-five minutes. After the third treatment proctoscopic examination showed no ulceration of mucosa; rectum and sigmoid appeared normal but for occasional petechiae. Stools were well formed and free from blood or amoebae. The patient gained weight and two months later was well, symptom free, and stool examination was negative.

H. M. H.

ANDERSON (Hamilton H.) & KOCH (Dorothy A.). **Iodochloroxyquinoline (Vioform, N.N.R.) as an Amebicide in Macaques.**—*Proc. Soc. Experim. Biol. & Med.* 1931. May. Vol. 28. No. 8. pp. 838-841. [4 refs.] [Med. School Univ. of California, & Pacific Inst. of Trop. Med., Hooper Foundation for Med. Research, San Francisco.]

Seven of eight Macaques, naturally infested with *Entamoeba histolytica*, had remained free of these parasites for 3 months after receiving orally 900 to 1,200 mgm. per kilo of iodochloroxyquinoline (Vioform N.N.R.) given in divided doses over 3 to 6 weeks. The stools of 2 of 3 monkeys infested with *Balantidium coli* have been negative during this follow-up period. Of the 2 monkeys harbouring *Strongyloides stercoralis*, one was cleared of this infestation. The authors believe that important factors in their results were the hygienic conditions maintained and the precautions taken to prevent reinfection in animals under treatment. All treated animals gained weight, developed normally, and showed marked general physical improvement, following the therapeutic régime. None showed evidence of drug toxicity.

H. M. H.

CLEVELAND (L. R.) & SANDERS (Elizabeth P.). **The Production of Bacteria-free Amoebic Abscesses in the Liver of Cats and Observations on the Amoebae in Various Media with and without Bacteria.**—Reprinted from *Science*. 1930. Aug. 8. Vol. 72. No. 1858. pp. 149-151. [Med. School, Harvard Univ., Boston.]

This very interesting paper is itself so summarily concise [and all the better therefor], and yet so compact of essential experimental evidence that to summarize again is to do it much injustice. Only a few points may be abstracted from it. On three occasions the authors obtained bacteriologically sterile amoebae after washing the cysts of *E. histolytica*. Several million cysts were washed (by methods described) and

most of them were killed in the process for only a few amoebae were obtained. None of these bacteria-free trophozoites lived longer than six days, and after the second day they were evidently abnormal organisms both in size and movement, perhaps as result of the treatment employed.

The authors have taken advantage of the fact that the cat's liver can destroy many kinds of bacteria. By laparotomy and direct inoculation into cat's liver they found that inocula, 0.2 to 0.3 cc., of dysenteric stool failed to produce bacteria-free abscess; the majority of animals died within two or three days. With culture inocula, 0.5 cc., containing, besides the culture bacteria, about 5 million amoebae, they succeeded, out of 30 cats inoculated into liver, in producing liver abscesses in 12 and in 8 of these amoebae were obtained in culture free of all bacteria (aerobic and anaerobic culture). The culture inoculum should be at least a month old and from 7 to 9 days after inoculation into cat's liver is the best time to obtain amoebae with no bacteria. The authors cannot state definitely yet just what happens to the abscesses which contain no bacteria if the animal is not killed for examination, because they have not carried out a sufficient number of experiments. But their experiments so far indicate that soon after the abscess becomes free of bacteria it begins to heal and within five to ten days no amoebae are present.

As result of inoculation of amoebae and bacteria into the cat's liver they failed sometimes to produce abscesses and sometimes produced abscesses ranging all the way from purely bacterial ones with no amoebae in them to those containing only amoebae. Whenever amoebae were present in an abscess, regardless of whether bacteria were present or not, there was no membrane or wall of granulation tissue at the periphery of the abscess. Whenever pus was present in the abscess the amoebae were always to be found accompanied by bacteria. With much pus the amoebae were confined to outer portion near uninjured tissue; but when no bacteria were present the entire "abscess" was hard and dry and distribution of amoebae was uniform throughout. In the abscesses studied there was no indication that amoebae ever bring about pus formation. However, if the abscesses were to run a long time—months, years, as they are supposed to do in man—possibly pus might be formed. The bacteria-free amoebae obtained from these abscesses have been placed in many kinds of culture media, but in no instance have they lived longer than 14 days.

On a medium composed of liver infusion agar slant covered with serum saline and sterile rice flour, the amoebae grew well eventually with the spore forming bacteria *B. niger*, *B. mesentericus*, *B. brevis*; while with *Bact. coli communis*, *Vibrio cholerae* and *Neisseria catarrhalis* they grew well from the start. There was little or no multiplication with *Bacillus megatherium*, *B. cereus*, *B. subtilis*, *Proteus vulgaris*, *Bact. acidi-lactici*, *Pseudomonas aeruginosa*, and *Bact. faecalis alcaligenes*.

H. M. H.

CLEVELAND (L. R.) & SANDERS (Elizabeth P.). **The Virulence of a Pure Line and Several Strains of *Entamoeba histolytica* for the Liver of Cats and the Relation of Bacteria, Cultivation, and Liver Passage to Virulence.**—*Amer. Jl. Hyg.* 1930. Nov. Vol. 12. No. 3. pp. 569-605. [11 refs.] [Med. School, Harvard Univ., Boston.]

This extensive experimental research is set out in the fullest detail; some indication of its purpose, value and results may be given by

recording here that the authors found that under their experimental conditions, bacteria capable of doing some damage to the liver must accompany the amoebae before the latter are capable of maintaining themselves in the liver and producing an amoebic abscess. This, however [they note], may not be true of more virulent strains of *E. histolytica*; and, until further experiments are carried out, the general statement that bacteria must be present in the beginning of amoebic abscesses should not be made. In their pure line amoebae that had been in culture for a year or more an increase in the percentage of animals that became infected with passage was readily seen, although the bacteria may have been entirely responsible for the increase, just as they were in the liver passages. Amoebic abscess may be developed just as readily in the liver of adult cats as in kittens.

E. histolytica cultivated from acute cases of dysentery was found to be more infectious for the liver than for the intestine. The amoebae from carriers who had never had dysentery and from monkeys were found to be less pathogenic than amoebae from acute cases of dysentery, even after the latter had been cultivated for a year or more and had not been inoculated into animals. All attempts to produce brain abscesses in kittens, guineapigs and rabbits failed. Eight cats inoculated into liver via mesenteric vein did not develop liver abscess. No abscesses developed in any of the 9 monkeys, 16 rats, and 7 rabbits, that were inoculated into the liver.

H. M. H.

SIMIC (Tshedomir). Faut-il attribuer à l'amidon de riz la perte de l'action pathogène des amibes de culture ? [**Is the Loss of Pathogenic Power of Cultural Amoebae attributable to Rice Starch?**]—*Ann. Parasit. Humaine et Comparée*. 1930. Dec. 1. Vol. 8. No. 6. pp. 577-581. [3 refs.] [Hyg. Inst., Skoplje, Yugoslavia.]

The author gives details of his experiments. They lead him to conclude that culture and subculture of *Entamoeba histolytica* from the stools of man or cat, on artificial media cause the entamoeba to become more resistant to cold and less pathogenic for the cat; but after passage again through cat it again becomes less resistant to cold and more pathogenic to the cat. Strains of *E. histolytica* markedly pathogenic in the early subcultures become, after further subcultures, little or not at all pathogenic for the cat, but can be reinvigorated after cat passage. The author's strain of *E. histolytica* kept in culture for 245 days, on Loeffler-serum-Ringer medium, always with rice starch, has always proved infective for the cat, provided that it were passed from time to time through that animal.

H. M. H.

KAGY (Edwin S.) & FAUST (Ernest Carroll). **Effect of feeding Raw Liver to Dogs Infected with *Endamoeba histolytica*.**—*Proc. Soc. Experim. Biol. & Med.* 1930. Dec. Vol. 28. No. 3. pp. 252-253. [Dept. of Trop. Med., Tulane Univ., New Orleans.]

Four dogs on balanced diet were infected with an *E. histolytica* strain. A week or more later when the dogs showed active symptoms of dysentery, and were passing trophozoites of *E. histolytica* in stools, a single portion of 250 gm. of fresh calf's liver was fed to each animal. In each case bowel movements were markedly reduced within 24 hours;

stools became semi-formed with blood and mucus still present. In 3 of the 4 dogs cysts were present in the passed stools within one to seven days and continued intermittently until death of the animal (a few days to three weeks later). In each case proctoscopy revealed active lesions containing trophozoites. In the one animal in which cysts were not formed *E. histolytica* trophozoites were present on the day following the liver meal, but were not recovered subsequently. The animal died a week later of a profound bacteraemia. This feeding test (undertaken as a result of CLEVELAND and SANDERS' observations on encystation of *E. histolytica* grown on liver infusion agar medium, this *Bulletin*, Vol. 27, p. 887) suggests that liver substance plays an important role in providing a medium favourable for encystation of *E. histolytica* in the bowel. The fraction of the liver responsible is the subject of further study by the authors, who believe, however, that dehydration of the large bowel content is intimately associated with the problem of encystment.

H. M. H.

BOYD (J. S. K.). **Notes on an Outbreak of Amoebic Dysentery occurring among the Hounds of the Bangalore Hunt.**—*Jl. Roy. Army Med. Corps.* 1931. Jan. Vol. 56. No. 1. pp. 1-13. With 15 figs. [8 refs.]

After careful investigation of the outbreak the author concludes that :—

" (1) Hounds are capable of suffering from, in epidemic form, amoebic dysentery caused by an amoeba presenting all the morphological characters of *E. histolytica*.

" (2) As far as was observed in a large number of examinations cysts are not formed. As extensive experimental evidence shows that vegetative amoebae are not, under natural conditions, a potential source of infection to others, it follows that infection from hound to hound is impossible.

" (3) An apparent source of infection was discovered in the 'dog-boy' who prepared the food for the pack. Since he was dealt with by isolation and treatment no further cases have occurred.

" (4) The lesions did not resemble those in human amoebic dysentery. Rather they resembled those described by Brumpt as caused by *E. dispar* in the kitten. They were, however, more intense.

" (5) Emetine must be employed, if at all, with caution [e.g. 1 grain of E.B.I. produced death from cardiac failure in a hound weighing 60 lb.]. Probably better results will ensue from saline treatment and the administration of some specific *per os*."

H. M. H.

WALKIERS (J.). **Un cas d'amibiase intestinale chez un bovide. [Intestinal Amoebiasis in an Ox.]**—*Ann. Soc. Belge de Méd. Trop.* 1930. Dec. 31. Vol. 10. No. 4. pp. 379-380.

The ox suffered from muco-sanguineous diarrhoea. On examining its faeces by microscope the author found many erythrocytes, and *Amoeba histolytica*; 25 to 35 microns, ectoplasm sharply differentiated from vacuolated endoplasm, and in the vacuoles red blood cells. No cysts were found. Cessation of symptoms following emetine in intramuscular injections.

H. M. H.

BORTHWICK (T. C.). *Haemoptysis due to Entamoeba histolytica.*—*China Med. Jl.* 1931. Feb. Vol. 45. No. 2. p. 151.

The patient aged 44 had in years gone by suffered from dysentery but had had none for a year when he coughed up bright red frothy blood, "mixed with pus which on microscopic examination was found to contain large numbers of protozoa which were indistinguishable [by the author] from *Entamoeba histolytica*." The condition cleared up after four grains of emetine hydrochloride hypodermically.

H. M. H.

BACILLARY DYSENTERY.

COSTA MANDRY (O.) & GARRIDO MORALES (E.). *La disentería bacilar en Puerto Rico. [Bacillary Dysentery in Porto Rico.]*—*Bol. Asoc. Med. de Puerto Rico.* 1931. Feb. Vol. 23. No. 185. pp. 22-51. With 3 charts in text. [22 refs.]

The first part of this article is of historical interest for the author shows by quotations from a book by Pedro TOMÁS of Córdova in 1831, who himself obtained his information from a previous work by Valladares de SOTOMAYOR (1789), that a disease with fever, diarrhoea and the passing of blood, liable to become epidemic, and with high fatality, had existed from 1598 when attempts at colonization by 1,000 men had to be abandoned after 400 had died within a brief period. The history is sketched down to the epidemic of 1928 which is more fully dealt with. This and a previous increase in cases in 1899 followed a hurricane. A fortnight after the hurricane, of September 1928, a large number of cases of "gastro-intestinal disturbance with abdominal pain, and diarrhoea with mucus and blood" were reported to the Health Department of San Lorenzo. During November, 1907 cases were reported in all, 527 (27 per cent.) from San Lorenzo, 465 in Cayey, 309 in Cidra, and the remainder in numbers from 185 or less in various municipalities. In the three specified, of 936 cases investigated 673 were in the rural zone, 263 urban. Altogether during the year 1928-29, 6,473 cases of dysentery were notified and 717 died in 77 municipalities. The majority [proportion not stated] were adults between 20 and 40 years of age. Bacteriological examination was carried out in a small number only, 137 stools, and the organism obtained was *Bact. dysenteriae* Flexner.

In July 1930, an outbreak occurred in the new penitentiary in Rio Pedras; among 192 prisoners 38 were attacked during a period of 3 weeks, but odd cases cropped up during the next four months. The same type of bacillus was isolated. No fatalities are recorded.

H. H. S.

BELL (W. H.). *An Epidemic of Bacillary Dysentery in the United States Fleet.*—*U.S. Nav. Med. Bull.* 1931. Jan. Vol. 29. No. 1. pp. 139-172. With 1 text fig.

An interesting, very thorough, and valuable investigation of an epidemic of dysentery among the crews of ships operating in the Guantanamo area (Cuba). A sufficient preponderance of cases constituting the epidemic were of bacillary aetiology (Flexner) to characterize it as one of bacillary dysentery. The infection was conveyed from the Isthmus of Panama by one ship, the *Camden*, to

Guantanamo harbour. This ship was the primary focus from which the disease spread.

Various modes of contact dissemination may have been operative when the disease appeared on one after another of the several ships involved. The 51 members of the culinary force admitted to hospital make it a probable factor in dissemination; but the harbour water, through various forms of contact with it, especially shower baths and swimming, was the principal medium of spread, beginning with the specific type of pollution supplied by the effluent of the *Camden* alone and augmented by one ship after another as successive ships developed cases of the disease.

H. M. H.

VAUCEL (M.) & BOISSEAU (R.). La dysenterie bacillaire à Brazzaville pendant l'année 1930. [**Bacillary Dysentery at Brazzaville in 1930.**]—*Bull. Soc. Path. Exot.* 1931. Apr. 15. Vol. 24. No. 4. pp. 267-271. [3 refs.] [Pasteur Inst., Brazzaville.]

Shiga; and Flexner, Strong, Hiss and Pseudo-dysentery types of dysentery bacteria were all isolated. Percentage mortality from Shiga infections was double that of the other types. Bacillary dysentery as seen in Brazzaville had the same characters as in Europe, both clinically, and in the agglutination and biochemical reactions of the dysentery bacteria. A beginning has been made with preventive vaccination with formolized-Shiga-toxin.

H. M. H.

BUCHANAN (G.) & ROUX (Paul). **The Sonne Type of Dysentery in South Africa.**—*Jl. Med. Assoc. South Africa.* 1930. Nov. 22. Vol. 4. No. 22. pp. 685-687. [12 refs.]

This paper describes the clinical features of certain dysentery cases, resembling those of a mild Flexner dysentery; and the bacteriological data whereby the identity of an organism isolated from the dysentery cases was established as *Bact. dysenteriae* Sonne. This is the first record of the Sonne type of dysentery in South Africa.

H. M. H.

NELSON (Richard L.). **Sonne Dysentery: a Report of Thirty Cases of Dysentery in Children caused by *B. dysenteriae* Sonne.**—*Amer. Jl. Dis. Children.* 1931. Jan. Vol. 41. No. 1. pp. 15-25. With 2 charts in text. [10 refs.] [Children's & Infants' Hosp., & Harvard Med. School, Boston.]

A careful study of thirty cases of dysentery in children, occurring in Boston, in which *Bact. dysenteriae* Sonne was demonstrated. The methods of isolation and identification of the Sonne bacillus are given; and also records of the clinical features of the disease with case histories and clinical charts illustrative of the mild and severe forms. The author comments that the mildness of the majority of the cases is apt to indicate low virulence and consequent unimportance of the causative organism. One of his cases, however, shows it capable of assuming great invasive powers; there was persistent vomiting and prostration,

and ketosis. At autopsy scrapings from intestine and ureter grew many colonies of Sonne bacillus. In a number of the convalescents there was persistence of the organism in the stools over long periods. Carriers are therefore probably an important mode of spread of the infection. Because of the mildness of symptoms in many cases, especially in adults, children may readily be infected by elders who have suffered from a mild diarrhoea. Diagnosis is best established by isolation of the organism from the stools. Absence of a positive agglutination does not rule out a Sonne infection. In many cases agglutinins are present in the serum but often in too low a titre to be of diagnostic value.

H. M. H.

RIDING (D.). **Acute Bacillary Dysentery due to *Bacillus para-Shigae*.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1931. Apr. 25. Vol. 24. No. 6. pp. 613–616. [5 refs.] [Wellcome Trop. Research Labs., Khartoum.]

A small epidemic occurring among some 60 British officials gave the opportunity for fixation of the probable incubation period of the Schmitz bacillus, *Bact. para-shigae*, as less than 4 days. Six cases of acute dysentery occurred and in all these the indole-positive strain of the bacillus was isolated. An opportunity also occurred of making comparison of indole-negative strains from two Sudanese natives with the positive strains and showed that each of these belonged to a serologically distinct and homologous group.

W. F. Harvey.

KEEFER (Chester S.), YANG (Chi Shih) & HUANG (K. K.). **Anemia associated with Chronic Dysentery : Clinical Considerations, with Special Reference to the Cause and Treatment.**—*Arch. Intern. Med.* 1931. Mar. Vol. 47. No. 3. pp. 436–466. With 14 text figs. [25 refs.] [Peiping Union Med. College, Peking.]

A report of the result of a very careful study of sixteen patients with anaemia associated with chronic dysentery (bacillary). The anaemia varied in morphological characters and in response to treatment. On the basis of their observations the authors conclude that the cause of the anaemia is not always the same, but the most important factors are the nutritional disturbances that result from faulty diet and a process that interferes with normal nutrition. In some patients, important contributory factors were gastric anacidity, or blood loss or infection. In the group as a whole were observed all of the clinical features said to be characteristic of pernicious anaemia : e.g., similar morphological blood changes, characteristic response to liver treatment, atrophy of tongue papillae, changes in nervous system. The authors attribute these changes to the nutritional disturbances.

H. M. H.

SILVERMAN (Daniel N.) & FREEMSTER (Roy). **Types of Bacterial Dysentery in the South : a Clinical and Bacteriological Study.**—*Southern Med. Jl.* 1931. June. Vol. 24. No. 6. pp. 504–507. [7 refs.] [Med. School, Tulane Univ. of Louisiana, New Orleans.]

In the Southern States bacillary dysentery is endemic and increasing in frequency. Shiga, Flexner and Duval types have all been demonstrated.

In chronic cases vaccine therapy gave best results. The authors think the unusual types of bacterial dysentery encountered, e.g. streptococci and *Bact. enteritidis*, were secondary to true dysentery.

H. M. H.

VAN STEENIS (P. B.). De toxische verwickelingen bij bacillaire dysenterie. [The Toxic Complications of Bacillary Dysentery].—*Nederl. Tijdschr. v. Geneesk.* 1931. Feb. 21. 75th Year. 1st Half. No. 8. pp. 882-889. [Military Med. Lab., Weltevreden.]

The three explanations given of the cause of these complications are : (1) that they are due to the dysentery bacillus itself (Shiga-Kruse type); (2) to its toxin ; and (3) to an organism which has developed alongside the dysentery bacillus in the intestine. Of these, the second explanation seems the most probable. An analysis of 610 cases of clinically bacillary dysentery gave 21 suffering from one or more complications. These were : arthritis, usually of more than one joint 10 ; iritis 3 ; conjunctivitis 9 ; otitis media 2 ; otitis externa 9 ; myocardial degeneration 6 ; neuritis 1.

W. F. Harvey.

HÄSSLER (Erich). Epidemiologische, bakteriologische und klinische Beobachtungen an 235 ruhrkranken Kindern der Klinik in den Jahren 1926-1929 ; zugleich 2. Mitteilung ueber aktive Schutzimpfung gegen Ruhr. [Epidemiological, Bacteriological and Clinical Observations on 235 Cases of Dysentery in Children. Immunization against Dysentery].—*Jahrb. f. Kinderheilk.* 1931. May. Vol. 131. (3 Ser. Vol. 81). No. 5/6. pp. 285-303. With 8 curves. [16 refs.] [Children's Clinic, Univ., Leipzig.]

Dysentery has now been admitted to be a common and not a rare disease in infants. In recent years attention has been largely focussed on the occurrence of "E" dysentery (Kruse), also very usually called Sonne dysentery. KRUSE named his dysentery strains A to J pseudo-dysentery, on the grounds that they produced only abortive disease in healthy adults. But the name "pseudo" is a misnomer so far as children are concerned.

Of the 180 "E" strains collected all but one coagulated milk within 3 weeks. The exception, nevertheless, reacted to "E" serum. As regards mortality the statement of KRUSE that the A to J strains are little pathogenic holds good for older children. In this respect the E strains behave like the others.

Active immunization was carried out with a killed agar vaccine intracutaneously administered and containing A, D, E, H and I strains. There are grounds for thinking that it brought about a diminution of house infection.

W. F. Harvey.

SEN (Rangalal). Treatment of Acute Bacillary Dysentery in Children.—*Calcutta Med. Jl.* 1930. Nov. Vol. 25. No. 5. pp. 215-219.

The author lays stress on the importance of counteracting dehydration, which is a common and dangerous feature of the clinical syndrome of

bacillary dysentery in children. He reports the decided success in his hands of bacteriophage ("Bacte-Dysenterie-Phage").

H. M. H.

WONG (Dorothy Huie) & WONG (Amos I. H.). **The Significance of Dysentery Agglutinins in the Colostrum and Milk.**—*Nat. Med. J. China*. 1930. Dec. Vol. 16. No. 6. pp. 673-683. With 2 text figs. [19 refs.] [Peiping Union Med. College, Peking.]

The frequent occurrence of bacillary dysentery in a large number of apparently healthy patients after parturition attracted the authors' attention and led to a study of the agglutinins in colostrum and milk. Altogether 197 consecutive cases were investigated and showed a high percentage in which the findings were positive. The highest proportion of the reactions was to the mannite fermenters and this is in accordance with the predominant importance of these strains as compared with Shiga strains in the causation of the dysentery of Peiping. Agglutinins in the colostrum and in milk are taken to be just as indicative of actual infection or of the carrier state as would be their occurrence in the blood. The agglutination titre of colostrum was higher than that given by either milk or blood serum. In these estimations a titre of 1 in 200 was taken as the normal limit for mannite fermenters and 1 in 64 for the Shiga bacillus. On the basis of the presence of milk agglutinins 83.2 per cent. of Chinese women entering hospital are considered to have had a dysenteric infection. Proof that some of these were carriers was afforded by culture of the causative organism from the faeces.

W. F. Harvey.

MENNONNA (Gerardo). Osservazioni intorno ad alcuni casi di dissenteria acuta bacillare in Brava (Benadir). [**Cases of Acute Bacillary Dysentery in Brava (Italian Somaliland).**]—*Arch. Ital. Sci. Med. Colon*. 1931. Jan. 1. Vol. 12. No. 1. pp. 50-54. English summary (6 lines).

The author's summary runs—

"The author noticed in October 1929 a seat of acute bacillare dysentery started in Brava following heavy rains. This seat extinguished itself soon with the ceasing of the damp ambient; the disease had a serious and quick course; the antidysenteric serotherapy was efficacious; the general antidysenteric prophylaxis contributed to drive away the danger from the natives and especially from our countrymen."

A. G. B.

MIXED AND UNCLASSED DYSENTERY.

DE MENDONÇA (F. Carneiro). Investigações nas dysenterias do Rio de Janeiro no anno de 1930. [**Dysentery in Rio de Janeiro in 1930.**]—*Brasil-Medico*. 1931. Feb. 7. Vol. 45. No. 6. pp. 124-129.

This is a bacteriological study of 804 cases. Bacilli were isolated in 220 or 27.4 per cent.; the Flexner type greatly predominated, there being 162 (73.6 per cent.) to 46 (21 per cent.) Shiga, the remaining few being Sonne and Schmitz bacilli. 453 possible carriers were examined among whom 22 were found positive: Flexner 20, Shiga and Schmitz one each. The total 804 are, for purposes of description, divided into 516 urban and 288 rural cases. The relative proportions of the types

of bacillus found differed but little in the two groups. Of 153 urban positives there were 114 (74.5 per cent.) Flexner, 32 (20.9 per cent.) Shiga, Sonne 4 and Schmitz 3. Sixty-seven of the 288 rural cases were positive, Flexner 48, Shiga 14, Sonne 4, and Schmitz 1. Amoebae were found in one instance only, the stools not being fresh enough for search to be of any value in this respect. Macroscopic examination and the cellular content of the stools in relation to type of organism are also considered, but nothing new is recorded. Serum agglutination tests were carried out on 114 patients, with positive results in one-third of the cases. Twenty-one of the 38 agglutinated *Bact. dysenteriae* Shiga, 14 Flexner and 3 the Schmitz bacillus. The actual titres are not stated, but all were above 1 in 100.

H. H. S.

PERUZZI (Mario). La *Vibriothrix zeylanica* di Castellani nelle affezioni enteriche ad Alessandria (prime constatazioni in Egitto). [*Vibrio zeylanica* of Castellani in Intestinal Affections at Alexandria.]-*Ann. di Med. Nav. e Colon.* 1930. Sept.-Oct. Year 36. Vol. 2. No. 3-4. pp. 541-549. [11 refs.] [Benito Mussolini Italian Hosp., Alexandria.]

Observations on the Occurrence of *Vibriothrix zeylanica* Castellani in Egypt.—*Jl. Trop. Med. & Hyg.* 1931. June 1. Vol. 34. No. 11. pp. 147-149. With 1 text fig. [13 refs.]

In a systematic examination of the faeces of 74 patients there were isolated 7 strains of *Vibriothrix zeylanica*. This organism when found is commonly associated with cases of ulcerative bacillary dysentery. Here also 6 out of the 7 strains isolated showed this association; in 4 the Shiga-Kruse bacillus was isolated and in the remaining 2 the serum reactions afforded evidence of the existence of dysentery. The 7th case was the most interesting and exceptional inasmuch as the association was with the typhoid and not with the dysentery bacillus. The patient was extremely ill and died in hospital. *Bact. typhosum* was isolated from the stools. Blood culture however was not done. The serum of this patient agglutinated *Bact. typhosum* to a dilution of 1 in 100 but also agglutinated the *Vibriothrix zeylanica*. As the latter organism was not agglutinated by sera of other cases of typhoid, nor by plague and normal sera, it is concluded that in this particular instance the vibriothrix had acted not merely as an ancillary intestinal organism, but had passed the barrier of the intestinal mucosa.

W. F. Harvey.

RIDDER. Balantidium-Colitis. (Beitrag zur Diagnose und Therapie sporadischer "Ruhr"-Fälle.) [*Balantidial Colitis*.]-*Muench. Med. Woch.* 1931. Feb. 13. Vol. 78. No. 7. pp. 268-269. [14 refs.] [Bethel Hosp., Bückeburg.]

Report of a case of chronic mucosanguineous diarrhoea. Stool examination revealed *Balantidium coli* and apparent complete cure followed on emetine therapy.

H. M. H.

- BLONDIN (P.) & ASSALI (J.). A propos d'un abcès du foie chez un Sénégalais.—*Bull. Soc. Path. Exot.* 1931. Feb. 11. Vol. 24. No. 2. pp. 155-157.
- BRESSOT (E.). L'hépatite suppurée amibienne du lobe gauche.—*Presse Méd.* 1930. Dec. 27. Vol. 38. No. 104. pp. 1793-1794.
- BRUNELLI (Piero). Su di un caso di cistite amebica da *Entamoeba histolytica*.—*Arch. Ital. Sci. Med. Colon.* 1931. Apr. 1. Vol. 12. No. 4. pp. 218-222. With 1 text fig. English summary (5 lines).
- DRAKE-BROCKMAN (R. E.). Amoebic Hepatitis with Haematemeses.—*Brit. Med. J.* 1931. Mar. 14. pp. 444-445.
- GERBASI (M.). Le correnti d'azione del cuore nei bambini affetti da amebiasi.—*Pediatrics.* 1931. May 15. Vol. 39. No. 10. pp. 513-525. With 4 text figs. [4 refs.] [Inst. of Clin. Pediatrics, Univ., Palermo.]
- INNES (F.). A Clinical Survey of Bacillary Dysentery.—*Jl. Assoc. Med. Women in India.* 1931. Feb. Vol. 19. No. 1. pp. 21-30.
- MAEJI (Yukiyasu). Beitrag zur Therapie der Amoebenruhr mit Rivanol.—*Acta Scholae Med. Univ. Imperialis in Kioto.* 1931. Vol. 13. No. 4. pp. 404-408. [2nd Med. Clinic, Imperial Univ., Kyoto.]
- PATRIARCA (Mario). Fattore di contagio in un caso di amebiasi intestinale.—*Ann. d'Igiene.* 1930. Aug. Vol. 40. No. 8. pp. 604-606.
- PENSO (Giuseppe). Sulla patogenicità del "Balantidium coli."—*Polislinico.* Sez. Prat. 1931. Feb. 23. Vol. 38. No. 8. pp. 255-261. With 15 text figs. [Inst. of Med. Parasit., Univ., Rome.]
- PENSO (Giuseppe). Sulla patogenicità dell' entamoeba coli.—*Riforma Med.* 1931. Apr. 20. Vol. 47. No. 16. pp. 601-602, 605. [15 refs.]
- PETRIDIS (Pavlos). Le traitement chirurgical de la dysenterie et de ses complications locales.—*Jl. Egyptian Med Assoc.* 1931. Jan., Feb. & Mar. Vol. 14. Nos. 1, 2 & 3. pp. 27-39; 94-117; 167-189. [Refs. in footnotes.]
- PETZETAKIS (M.). La dysenterie amibienne en Grèce. Abcès amibien du foie ouvert dans les bronches, méconnu pendant dix mois. Guérison rapide par les injections intraveineuses d'émétine et le stovarsol.—*Bull. et Mém. Soc. Méd. Hôpit. de Paris.* 1931. Feb. 23. Year 47. 3rd Ser. No. 6. pp. 256-261. With 2 text figs. [1 ref.]
- QUENARDEL & KIMSAN. Observations cliniques d'abcès du foie guéris par le traitement médical.—*Bull. Soc. Méd.-Chirurg. Indochine.* 1930. Dec. Vol. 8. No. 12. pp. 1014-1019.
- DA ROCHA (Martinho). Um caso de dysenteria typo Sonne com invaginação intestinal.—*Brasil-Med.* 1931. May 30. Vol. 45. No. 22. pp. 491-494. With 3 text figs. [5 refs.]
- SABRAZÈS (J.). L'amibiase, d'après le Docteur Vendevre.—*Gaz. hebd. Sci. Méd. de Bordeaux* 1931. Apr. 19. Vol. 52. No. 16. pp. 241-244.
- SANGUINETTI (Lucio V.). Tumor inflamatorio del colon de origen amebiano.—*Arch. Argentinos Enferm. Aparato Digest. y Nutric.* Buenos Aires. 1931. Feb.-Mar. Vol. 6. No. 3. pp. 558-567. With 3 text figs. [12 refs.]
- SERIO (F.). In tema di cura medica dell'epatite amebica colliquata.—*Polislinico.* Sez. Prat. 1931. May 18. Vol. 38. No. 20. pp. 701-702. [Med. Clinic, Univ., Palermo.]
- TOURNIER. Le traitement de la dysenterie amibienne.—*Ann. de Méd. et de Pharm. Colon.* 1930. Oct.-Nov.-Dec. Vol. 28. No. 4. pp. 557-586. [Refs. in footnotes.]
- VACCAREZZA (Raúl F.). Sobre un caso de amibosis pulmonar.—*Prensa Méd. Argentina.* 1931. Apr. 20. Vol. 17. No. 32. pp. 1584-1591. With 2 text figs.
- VALERIO (Americo). Considerações clinicas sobre as dysenterias amebicas.—*Folha Med.* 1931. Apr. 25. Vol. 12. No. 12. p. 133.

HISTORICAL.

VAN ANDEL (M. A.). Geneeskunde en hygiëne op de slavenschepen in den compagnietijd. [**Medicine and Hygiene in the Slave Ships in the Time of the West India Company.**]—*Nederl. Tijdschr. v. Geneesk.* 1931. Feb. 7. 75th Year. 1st Half. No. 6. pp. 614-637. With 3 figs. on 1 folding plate. [30 refs.]

The days of old-time slavery and even of sailing ships and scurvy may be considered as well-nigh departed, but the account here given of the conditions of the sea-borne slave trade in the 17th and 18th centuries serves to remind us of what may almost be regarded as the beginnings of organized tropical medicine and hygiene.

Any history of the introduction of disease must of necessity give due weight to the medical accounts of the trade in slaves. A far reaching charter of trading rights was given in 1621 by the States General of Holland to the West India Company and the slave trade to America from Africa was one of the most important activities of this company. Early Portuguese and Spanish settlements found it impossible to utilize the original inhabitants of their colonies for the heavy pioneer work on the land. Labour was obtained from Africa, largely through the agency of the Dutch West India Company, and so the slave trade arose. Between 1637 and 1649 the negroes so brought into Brazil were 12,163 at a cost of 7 million florins. According to GALLANDAT, who held the title of *Lector anatomiae, chirurgiae et artis obstetricae* at Flushing and who was the author of a work on "The Requirements of the Slave Trade," there were years in which 70,000 slaves were exported from Africa to America. A slave, according to BOSMAN, who for purchase, maintenance and transport cost 200 florins, realized by sale something like 800 to 1,000 florins. The profits were large, but were, for reasons set out in this article, speculative. The speculative elements were represented by the weather, mortality and sickness, which could reduce profits on such a perishable cargo to zero. Thus dietary, hygiene and prevention of disease among the slaves became very important considerations to the slave trader.

The first purchase transaction was supremely important. An older man or woman might by artifice be palmed off as a younger one. "No coquette" says GALLANDAT, "is so concerned to dress herself up as is the slave dealer his old slaves. Their toilet is carefully made: grey hairs are removed from hair and beard and they receive abundance to eat and drink." A company surgeon was deputed to examine slaves, men and women stripped naked, and to discover the existence of physical defects such as cataract, hernia and prolapsus uteri. Diseases which are specially mentioned are dysentery, small pox, fevers, guinea worm, elephantiasis, yaws, venereal disease and chronic malaria. After the health inspection was over and sick or disabled slaves had been rejected, those chosen were branded on the shoulder with the mark of the purchaser. Now came the sea journey, which might even last for half a year. This journey in the 17th and 18th century was a serious undertaking even for war ships and merchant ships, but very much more so for a ship with a cargo of slaves. The insurance premium on the cargo amounted to 3 per cent. against natural, wilful or violent death, but the insurance money was only payable in the event of the mortality exceeding 15 per cent. Overcrowding was very common, even though traders were well aware of the danger of such procedure. A ship of 25 metres length and 8 metres width, with a slave room under

the deck of 1·70 to 1·80 metres height was reckoned on for a cargo of 300 slaves. It might even be that the sleeping accommodation, for all its low height, was arranged with two tiers of boards. Ventilation of the slave quarters was one of the great difficulties of the ship master. Every endeavour was made to get the slaves on deck daily in order that their quarters should be ventilated and that they should have the opportunity of washing, exercising and even of recreation in the shape of dancing to the music of the drum.

Commissariat arrangements for a population of the kind here concerned were naturally of the highest importance. A list of food and other stuffs for 400 slaves from Guinea to Curaçao is set down as 1,800 pounds pork, 800 pounds hard bread, 320 sacks groats, 160 sacks beans, 300 pounds tamarinds, 5 half measures corn spirit, 2 half measures French brandy, 3 hogsheads vinegar, one barrel tobacco and 12 gross tobacco pipes. Fresh fruit, fresh fish and fresh meat were taken in whenever the opportunity offered, for the dread of scurvy was a very real one. Thus a slave ship in 1668 filled up with 900 oranges, 5,000 lemons, cocoanuts, pineapples, 90 fowls and 2 goats and all this provender was obtained for the modest sum of 16 florins. The question of water supply was almost as important as that of food. According to GALLANDAT the water obtainable on the Guinea coast was apt to cause diarrhoea, dysentery and infection with guinea worm. It would be well, says he, always to boil the water but this is impossible except perhaps for the sick. The addition of some drops of vitriol or vinegar to the water is recommended as a preventive of disease carrying properties.

Actual mortality amongst the slaves affords a good test of the effectiveness of the hygiene precautions taken in this trade. We read here of a voyage from Madagascar to Sumatra lasting from 1st September to 6th February with death of 139 slaves out of a total of 236 and the further death within four months of more than half of the remainder. The other extreme is given of a cargo of 425 slaves arriving in Surinam with only 6 deaths on the voyage. In the rules of conduct laid down for skippers it was enjoined that the sick should always be separated from the sound but this seems to have often been more of a rule than a reality. The records of the slave trade are fairly detailed on the subject of preventive measures against disease, but are not explicit on treatment. Quarantine arrangements, especially against smallpox, were seemingly strict, as a result of bitter experience. In Surinam, slave ships were visited by the surgeon major who reported to the Governor and only then, if the report was favourable, was permission for disembarkation given. In the case of infective disease being present on board, the ship had to remain outside until it was over.

These are some of the subjects touched on in this article. Slave traders were not philanthropists. Their measures of hygiene especially, which read uncommonly sound, were dictated solely by considerations of the immediate financial loss produced by sickness and death.

W. F. Harvey.

STITT (E. R.). **Our Disease Inheritance from Slavery.**—*U.S. Nav. Med. Bull.* 1928. Oct. Vol. 26. No. 4. pp. 801-817.

The Surgeon General of the United States Navy gives an interesting account of the diseases believed to have been introduced into North

America with the African slaves. He discusses at the outset the diseases found among the Indians on the arrival of the European colonists. Tuberculosis did not exist among them; in this all authorities seem to be agreed and a long quotation as to the rarity or absence of the disease is given from HRDLICKA. The whites introduced measles and scarlet fever, and smallpox "which did more to decimate the aborigines of the New World than all other diseases and warfare combined." The author believes that the mild type of smallpox, the so-called alastrim, was introduced by the slaves and the virulent strain, of Eastern origin, came in with the settlers. According to THOMSON the practice of inoculation was known in Africa from remotest times.

Among diseases probably introduced from Africa he names blackwater fever and subtertian malaria. Dysentery was common among the slaves and he cites WINTERBOTTOM: "Out of the cargoes of several ships consisting of 600 or 700 slaves each, dysentery killed 250 on one ship, 220 on another, 150 on a third, 60 on a fourth and 82 on the fifth one of the squadron"; it appears to have been bacillary rather than amoebic.

It seems well established that hookworm was introduced with the slaves; the author found frequent references to it in old slave records under the designations, mal d'estomac, malacia, dirt-eating disease. Sleeping sickness was of course introduced by the Africans but owing to the absence of its vector did not spread. The focus of leprosy near New Orleans is probably of African origin, but that the United States is not a favourable habitat for this disease was shown by HANSEN who among the descendants of 160 known Norwegian lepers in the North-Western States could not find a single infected person.

Filariasis was introduced by the slaves into the Southern States, but has disappeared except from Charleston, S.C. where *F. bancrofti* is found. FRANCIS suggested that a large ship-load of heavily infected slaves reached this port and the slaves were retained there for a sufficient time to provide a permanent focus.

The author discusses yaws at some length and expresses surprise that a disease so often introduced into the Southern States never became established there. He quotes from SYDENHAM who attributed the syphilis of Europe to the importation of yaws from the coast of Guinea. Yellow fever the author believes came to America from Africa rather than in the reverse direction. His conclusions are as follows:

"Summing up the probabilities of disease importation into our Southern States by African slaves we would seem justified in assuming that the malignant tertian malaria and its associated blackwater fever came from West Africa, where both of these diseases prevail extensively. Blackwater fever certainly was not brought in by the European colonists.

"Bacillary dysentery was one of the scourges of the slave ships and was undoubtedly introduced into the colonies. The evidence I have been able to find as to the bringing in of amoebic dysentery is negative.

"The restricted endemic area of filariasis in Charleston, S.C., offers an interesting epidemiological study. This disease, with its accompanying elephantiasis, was recognized in the West Indies as of African importation.

"The Guinea worm was undoubtedly introduced into the American colonies, but failed to secure a suitable host. In the West Indies, however, it succeeded in establishing itself for a time, but later disappeared.

"There can be no doubt that hookworm disease came in with the slaves. It would seem probable, in view of the assigning of the introduction of leprosy into the West Indian colonies to the slaves, that the endemic area of leprosy in the southern United States had a similar origin.

"Neither the parasites of African sleeping sickness nor rectal bilharziasis seem to have secured a foothold in the United States, although the latter exists in certain West Indian islands. In the body of my paper I have dealt rather fully with the question of the introduction of yaws into the New World by the slaves. What became of this serious infection, which must have been brought into the American colonies, just as it was into the West Indian islands? Is the identity of syphilis and yaws the answer?"

"If, as I am convinced, yellow fever was introduced through slave ships into the United States by infected mosquitoes (which Stokes has recently shown can transmit the disease after three months) we have here a curse greater than any of the curses which the Egyptians suffered through their enslavement of the Jews."

A. G. B.

VAN DER HOEVEN (J.). E. K. Rodschied, een West-Indisch tropenarts uit het einde der 18de eeuw. [**E. K. Rodschied, a Practitioner in the West Indies of the 18th Century.**].—*Nederl. Tijdschr. v. Geneesk.* 1929. Mar. 2. 72nd Year. 1st Half. No. 9. pp. 1101-1107.

The history of medical science, as of science in general, is very largely a record of the sayings and doings of prominent individuals. It is very instructive therefore to go back to the olden times through the medium of the published works of those who lived in them and learn something of the genesis of our present ideals. Dr. RODSCHIED's work "Medical and Surgical Notes on the Climate, the Mode of life and Diseases of the Inhabitants of the Dutch Colony Rio Essequibo"* was published in Frankfort in 1796. In the present article, largely culled from this work, we are presented with a picture of life and the state of medical science in the Dutch settlements in Guiana at the end of the 18th century. The slave trade was at its height. Only imported labour would serve for the development of the new colonies. In this latter respect a parallel is afforded to the conditions obtaining in Dutch Sumatra only 30 or 40 years ago. The conditions in Dutch Guiana were very primitive, and the population a very conglomerate one. Hard drinking was the rule and indeed the use of spirits was advocated to render the miasmata harmless and to dull the pain of mosquito bites. An improvement is registered with the replacement of rum for gin, which represented a much more dilute form of alcohol. Most of the lessons to be extracted from RODSCHIED's commentaries have reference to the treatment of slaves. Those were early days to find recognition of the identity of interests of employer and employed, but RODSCHIED himself realized that economy of working costs lay in the preservation of the lives of the workers. A slave was not cheaply procured, but what seemed to please the average planter most was the cheapness of his contract for medical attendance. The doctor of the time was still merely a barber-surgeon, although he was absolved from the duty of shaving the slave population of the estate.

Doctor RODSCHIED himself stands head and shoulders above the medical practitioners of the ship doctor type. He had studied both the healing sciences in Marburg, and realized with much prescience what was required in the way of hospital, food and water provision for the costly slave population. Not less than 50 slaves were required to work a plantation and, at 250 florins apiece, they represented what was a very large capital outlay for those days. The planter took very great

* Now part of British Guiana.

pains over his initial purchase, even if he did not take as good care of it afterwards as he should. The slaves were paraded for sale and were very thoroughly examined by their prospective masters who made certain that they bought no "pig in a poke." Their arms, their legs, their teeth and their hair were all inspected and their movements also. It was therefore all the more extraordinary that no glimmerings of sanitary science seemed to illuminate the provisions made for upkeep of the human live stock of plantations. Everything was left to providence and the climate blamed for all sickness and mortality. Slaves were required to work for 12 hours a day. Their food for the week was a bunch of bananas, 1½-2 lbs. salt meat and 2 or 3 tots of rum. For the rest they were at liberty in their free time and on Sundays to cultivate cassava, potatoes and other vegetables, to rear fowls and ducks or to bring some variation into their diet by fishing or by catching crabs.

Doctor RODSCHIED likewise points out that admission to the hospitals often meant exacerbation of sickness instead of cure. And how could it be otherwise with hospitals like prisons, without windows, with insufficient provision against heat, built on swampy ground, with the floor for bed and without separate accommodation for the sexes or for special diseases. How could patients suffering from such diseases as dysentery, worms, etc., contracted through drinking impure water, be expected to recover when they were supplied with the same impure water in hospital? In times of drought especially the negro slaves were hard put to it for water. The natural water was brackish, while springs and wells did not exist. The food, too, of patients was quite unsuitable and consisted chiefly of bananas. It should have been within the power of the doctor to prescribe rice, meal, vegetables, bread, wine and meat: these are in reality medicines, often better than kino, calomel and opium.

Much that was proclaimed by RODSCHIED was not fully realized for a century later. He was a pioneer sanitarian in times that were not yet ripe for improvement. Although he was convinced of the obligation of the planter to improve the living and housing conditions of his slaves he had no mercy for the erring labourer who produced festering sores upon himself in order to escape work. He approved of the treatment in such a case, where the man was confined in darkness and bound hand and foot in the stocks. In this respect he was no more than "a child of his time."

Much more of interest to us of the present day could be extracted from the writings of this tropical hygienist. He calls attention for instance to the difficulties of diagnosis of disease in tropical climates, where the affection often takes a different form from that observed in the temperate zone and where the darkness of the skin of the patient hides many familiar manifestations. One disease in particular is singled out by the author of the article for comment, in which pronounced symptoms were abnormal hunger and an unnatural craving satisfied by the eating of earth. Death is the inevitable ending and is due to non-recognition of the fact that the negro has become sick of life and more or less commits suicide, happy in the belief that when he rises again it will be in his own fatherland.

This survey of life in the 18th century serves to place before us a vivid picture of the conditions which have been replaced by our present sanitary modes and our present humane treatment of our fellow beings. The good old times were full of adventure no doubt, but were also times of disabling sickness and high mortality.

W. F. Harvey.

PARSONS (Robert P.). *History of Haitian Medicine*.—*Ann. Med. History*, 1929. May. Vol. 1. No. 3. pp. 291-324. With 8 text figs. [21 refs.]

Haitian medicine, we are told, falls logically into three principal periods: the French Colonial period, 17th and 18th centuries; the independent period, 1804 to 1915; and the period of American occupation. With the last we are not now concerned.

The history begins with the landing of Columbus at Mole St. Nicholas, a point of the island near to Cuba, in 1492, the exploitation by the Spanish, and the disappearance of the Caribs which was mainly due to smallpox. In 1503 the first African slaves arrived and by 1790 importations and increases by birth had brought the slave population to half a million. BUTLER writes: "It is reasonable to think that during 292 years of slave trade between 1512 and 1804 every type of disease that the continent of Africa might boast of had been brought to Haiti." SYDENHAM states that yaws came in the slave-ships from Africa; yaws was then the chief cause of damage to the slave-trade, and now in Haiti it probably is the occasion of greater economic loss than all other diseases combined.

The French settlement began with the arrival of the buccaneers about 1625. In the next hundred years the colony prospered, becoming the richest of French colonies, but there is little record of medical activity. Tetanus was a frequent cause of death especially among the new born of the slaves. A medical writer says: "If one exposes them to the air at the moment of birth they get a convulsion of the jaws which prevents them from nursing and from which they die." The slaves were for the most part treated for diseases by the witch doctors, but on the richer plantations there was usually a special building serving as hospital in charge of a negress. "Those not very sick were often chained to their beds lest their illness be too much of a holiday for them." Yaws was treated in the slave huts or in a special building, and increased fees were charged to the owners. A writer in 1752 described many cases of guinea-worm, which is not found in Haiti to-day "life outside the human host being evidently unsuitable." The author refers to the "strange disease" *Mal de Siam*, and discusses its possible nature. [There seems to be no doubt that this was yellow fever. Reference was made to it in this *Bulletin*, Vol. 23, p. 612 and an elucidatory footnote is here reproduced.]* Yellow fever is mentioned elsewhere and especially as virtually destroying the French army in Haiti in 1804. Other diseases named are leprosy and smallpox. Sleeping sickness is not recorded. Good work was done in those far-off times. M. de LOPPINOT was commended for sanitary work done in 1783. This officer "with very little means, accomplished much for the health of the inhabitants by filling

* "So called because of the general belief in early colonial days that the disease had been imported from Siam. It is mentioned by LABAT, CHEVALON, DESPORTES, MOREAU DE SAINT-MERY, and other chroniclers of the period and was known by this name in Martinique and San Domingo near the close of the seventeenth century. It is found designated by this name in the old Government and local records of these islands."—AUGUSTIN. *History of Yellow Fever*. 1909 p. 79.

From further information in AUGUSTIN's book it appears that in consequence of an insurrection in Siam in 1688 a ship-of-war brought French settlers away and, driven out of its course by storms, reached Martinique, after having called (according to one account) at a Brazilian port. In any case, over 100 persons died of *Typhus miasmaticus ataxique putride jaune*, the unhandy name by which yellow fever was then known to the French.—ED.

in low areas which spread infected emanations into the air." This period came to an end with the slaves' revolt in 1793, Napoleon's despatch of an army and its final defeat, chiefly by yellow fever, in 1803-4.

"When independence arrived progress ceased." There was an almost continuous decline in civilization until 1915. An account is given of the efforts of a few European doctors to improve the knowledge of medicine and surgery, but these were brought to nought by political intrigues.

In 1915 the American occupation began, and in reference to this the author says—"The negro has shown astonishing capabilities in many fields of human endeavour, not the least of which is in medicine. . . . Whether this will continue after the American occupation has withdrawn remains to be seen."

A. G. B.

STORRS (R.). **The White Man's Grave in the Eighteenth Century.**—*Jl. Roy. Army Med Corps.* 1929. Sept. Vol. 53. No. 3. pp. 226-230.

An extract with comments from a book entitled "Travels in Africa in the years 1785 to 1787" by a Frenchman, Monsieur COLBERY. The diseases described are malignant nervous fever ("thus called by the English"), dysentery, dry belly-ache,* tetanos, guinea-worm. These are the "five complaints which attack Europeans in the countries dependant on the Senegal government." A high tribute is paid to the knowledge and devotion of the English doctors.

A. G. B.

JOHNSTON-SAINT (P.). **An Outline of the History of Medicine in India.**—*Jl. Roy. Soc. Arts.* 1929. July 12. Vol. 77. No. 3999. pp. 844-869. With 7 figs. [45 refs.]

This contains the George Birdwood Memorial Lecture delivered in the Indian Section of the Royal Society of Arts on May 10th 1929. Captain Johnston-Saint is not a medical man, but had spent six years in India and studied the history of the country generally. The author begins with a reference to Dr. Gabriel BOUGHTON and the reward he received for successful treatment of several members of the household of Shah Jehan. There were other instances of the value of western medicine. After a long dissertation concerning western ignorance of Indian history, languages, medicine, etc., we come to the dawn of history in India and the beginning of Hindu literature, known as the Vedas which date back to 2000 B.C. and may possibly be older. The self-created Brahma, having for the guidance of the universe written the four Vedas including the Atharva Veda, communicated them to other gods, the two Aswins or sons of the sun becoming the custodians of the Atharva Veda and the medical attendants of the hierarchy of heaven. Then taking compassion on the sickness and suffering of mankind, the gods produced the Ayur-Veda which was a treatise of the science of life. Dhauwantari the Aesculapius of India came to earth to instruct mankind and received a deputation from the sages among

* Col. F. SMITH (*Jl. R.A.M.C.*, 1929, November) writes that dry belly-ache was lead colic, which prevailed in places where beverages, such as rum, were stored in leaden vessels or in containers having leaden pipes.

whom was Susruta the founder of Hindu surgery and author of the "Susruta Samhita." The so-called father of Hindu medicine was Charakha and he too wrote a book : " Charakha Samhita." We thus pass from myth to something more real, and the lecture carries on the tale of the teaching derived from Dhauwantari and his pupils. Two illustrations from the Wellcome Historical Medicine Museum, show Dhauwantari in fanciful surroundings. From the Ayur-Veda, of which the lecturer gives a brief account came the Ayurvedic system of medicine, which is followed in India at the present time, and he writes of the work of Susruta and Charakha (with reference to sources of information). Notwithstanding blemishes obvious to modern intelligence, the evidence of knowledge is remarkable at such an early date. The lecture continues with sections on instrumental surgery and Hindu ideas of anatomy. In 1836 when English surgery was first taught in India, only ten students in the whole of the peninsula would even consider the prospect of dissections and even then the high walls of the dissecting room had to be guarded by police, so strong was local feeling. Indeed, the nineteenth century brought knowledge of western surgery and medicine to India, which knowledge has been accepted and borne fruit although the ancient ignorance and practice still exist. Some very interesting illustrations are given of ancient Indian surgical instruments compared with modern instruments used for similar purposes. The *materia medica* of the Hindus is described as a marvel and in it we find a multitude of drugs belonging to the animal, vegetable and mineral kingdoms. Anyone interested in these matters might with advantage read " The *Materia Medica* of the Hindus " by Uday Chaud Durr. The hands of the Hindu surgeon were fettered and bound by Brahmin ritual and by the coming of Buddhism which practically prohibited the use of the knife. With the coming of Moslem conquerors the fall of Hindu medicine became rapid, and while Moslem Hakims flourished under princely protection, the Hindu Vaidyans held only the lowly offices of spell-makers to the poor. With the coming of Europeans—Portuguese, Dutch, French and English there came new methods, new teaching and a new outlook ; but in spite of all, the old methods and beliefs remain in some degree all over India.

J. H. Tull Walsh.

DE MELLO (Froilano). **History of Medicine in Portuguese India.**—*Arquivos da Escola Méd.-Cirurg. de Nova Goa.* Ser. B. 1930. No. 3. pp. 723-730.

After quoting early descriptions by Portuguese doctors of scurvy (1498) and cholera (1542) the author gives an account of the efforts made to diffuse medical science among the natives of Goa. Attempts made in 1687 and 1691 proved abortive, and it was not till 1801 that a professor of the Faculty of Coimbra, A. J. Miranda e Almeida, arrived in Goa and founded a School of Medicine and Surgery, comprising a three years' course taught by himself. In 1821 the course became one of four years : and in 1842 the present Escola Médico-Cirúrgica emerged : it is interesting to notice that one of the subjects for the fourth year was History of Medicine. In 1865 the course was extended to 5 years. Since the creation of the School, 616 doctors and 231 pharmacists have been licensed.

A. G. B.

GRACIAS (J. B. Amâncio). Notas para a história de Medicina em Goa. [**Notes on the History of Medicine in Goa.**]—*Arquivos da Escola Méd.-Cirurg. de Nova Goa*. 1927. Ser. A. pp.217-218. French summary p. 218.

The author finding in the archives of the local Treasury unpublished documents on the nomination of Carlos Eloy Bosse (1798) as assistant surgeon to the military hospital at Goa, seeks information about his nationality.

A. G. B.

OLPP (G.). Tropenärzte in Wort und Bild. [**Tropical Physicians in Pen and Portrait.**]—*Beihefte z. Arch. f. Schiffs- u. Trop.-Hyg.* 1929. Vol. 33. No. 3. pp. 243-248 (327-332). [9 refs.]

An interesting lecture in which some account is given of men whose discoveries have advanced tropical medicine, e.g., Aloys POLLENDER, Johann Wilhelm MEIGEN, Theodor BILHARZ, Wilhelm GRIESINGER, Walter REED and his colleagues, the recent victims of yellow fever on the Gold Coast, and lastly Wilhelm RÖHL, described as the discoverer of plasmochin and germanin. It will be observed that they are chiefly names that would appeal especially to a German audience. Portraits of these and others were shown.

A. G. B.

CELLI-FRAENTZEL (Anna). Comment la Gaule, civilisée par Rome, se dévoua à l'assainissement de Rome, au moyen âge et dans les temps modernes. [**How Gaul, Civilized by Rome, devoted Herself to the Assanitation of Rome in Mediaeval and Modern Times.**]—*Arch. Inst. Pasteur d'Algérie*. 1929. Sept.-Dec. Vol. 7. No. 3-4. pp. 239-286. With 1 map & 33 figs. on 29 plates. [Refs. in footnotes.]

This learned, well illustrated, and well-documented memoir is a story of the malaria-stricken wastes of the Roman coast. History in her obscure passage through the Dark Ages that immediately followed the subversion of Roman civilization by Goth and Vandal and Hun has been too much distracted by that catastrophe to preserve much information about those wastes. We know that in the course of those Dark Ages what had once been a fertile and healthful enough tract became a pestilential fenland; but whether the transformation was originally due to one of those periodic changes in local distribution of land and water that may anywhere occur in estuarine and delta country, or was the direct result of the ruin and devastation worked in southern Italy by Alaric and his West Goths in A.D. 410, are questions not easy to answer. Madame Celli seems to favour the opinion—which many people regard as an obvious *petitio principii*—that in one and the same natural region periodic variations in standards of salubrity have been the result of a periodic rise and fall in the intensity of malarial infection. Her theme, however, is not the causes of the transformation, but the persistent efforts carried on through the centuries to reclaim the pestilential waste for the use and enjoyment of man again. In these efforts France has throughout played a nobly-inspired and well-conceived part, and this memoir may be described as an invocation of the

Muses of History and of Epic song to commemorate the Frenchmen who have counted life well spent, even to the point of sacrifice, in the attempt.

History begins to speak in the letters of the Gaul RUTILIUS NAMATIUS, a prefect of the City, who returned to Rome six years after the third sack by Alaric in 410; he tells of the City as preserving its majesty in spite of indescribable damage, but of the countryside desolated and impassable, and of the existence of some marshy places at the mouth of the Tiber, but without any mention of unhealthiness; indeed, he was held-up there for fifteen days by contrary winds and came ashore to sleep every night in the open air, without distress, and this in the aestivo-autumnal season. Sixty years after this, SIDOINUS APOLLINARIUS of Lyon describes the region as "pestilential," and himself as there destroyed body and soul by "fever" and thirst. A few years later GREGORY of Tours (died circ. 594) "the first of the French historians," writes of the floods of the Tiber and their fatal consequences. And then, 700 years after RUTILIUS, comes HILDEBERT, also from Tours, with mournful strains of broken Roman pride, and temples lying in the marsh.

Nearly 200 years before Hildebert, in the year 936, there came to Rome from Clugny or Cluny in Burgundy Abbot ODO, a Benedictine of the reformed Cluniac Order. As is well known, the Cluniac offshoot of the Benedictines was founded with and in the monastery of Clugny and was based on a return to the simple rule and the strictly-disciplined self-effacing life which all ages have regarded as the ideal of the cloister. But with the monks of Cluny organized labour in a good vocation was as imperative as religious discipline and assiduous ritual—both were equally service dedicated to God. The primeval vocation for man is to till the ground from whence he came, and before all things the monks of Cluny were husbandmen; so under the auspices of Abbot ODO they came to Rome in the dawn of the Middle Ages and settled to work on the surrounding waste, substituting regulated intensive culture for the laxity of large estates and long leases. Their valiant enterprise was heartily approved by the ruling Roman king, ALBERIC II, who made over to them five abandoned monasteries without-the-walls (which otherwise might have become the dens of brigands) and so their work began. The author sketches their rural organization. Each monastery with its church and its accretions of immigrant lay-workers became a village, perhaps walled, and a sanctuary for all who were oppressed. Under the Prior, and usually chosen by the Abbot from among these immigrant lay-workers, was a "Major" or headman to supervise these workers in the fields and the collection and delivery of their harvest to the Prior. In the more distant intervening country each large monastery had its girdle of subordinate monasterioles or "cellae." The zealous ODO died of "fever," in 942, contracted during his last visit to Rome, and the author does not tell us how long the excellent Cluniac administration of the Campagna and Pontine Marshes persisted. She is certain, however, that no visible ruins of their work, such as still exist in other countries, are extant, and she thinks it probable that in the course of time the magnanimous effort of the monks of Cluny was frustrated by malarial fever.

A century-and-a-half after Abbot ODO French Monks of the Cistercian Order, under the papal aegis, took on the work. The Cistercians, as is well known, were another, later, reforming offshoot from the Benedictines, established at Citeaux (*Cistercium*), near Dijon, in Burgundy.

Even more than the monks of Cluny were the Cistercians in their beginnings, intent on subjugating the unruly nature within and the wild and uncultivated nature without. Their abbeys and monastic buildings were usually set in lonely valleys far from the haunts of men, where they cleared and cultivated the land like disciplined Roman legionaries in permanent encampment, the monks working in the field with the lay-brothers, and the abbot himself lending a helping hand at hay-time and harvest. Their organization for work was like that of the Cluniac monks; they had their abbey churches and adjoined monastic buildings, and around each a circle of subordinate monasterioles or "granges" chiefly for monks experienced in agriculture. In the time of the famous ST. BERNARD (1091-1153) Abbot of Clairvaux, the Cistercians came from France to Italy, where they were welcomed by popes and bishops and were given settlements in the Campagna and Pontine Marshes (and in other notoriously unhealthy places). The author tells the names, with the particular benefactions, of the popes who stood by them during the 12th century, with special appreciation of the popes CALIXTUS II and INNOCENT III, and also of Hugo, bishop of Velletri, who gave them the monastery of Marmassola in the Pontine Marshes, which remained a centre of activity until the early years of the 14th century. Not a few of the Cistercian abbeys and monastic buildings still remain to commemorate these self-sacrificing monks; among these the abbey of Three Fountains, near Rome (gift of pope Innocent II) and the monastery of Fossanova in the Pontine Marshes, are still regarded as good examples of Early Gothic architecture. Of Three Fountains we hear again, but in the interval we follow the author's account of French testimony to the alternating prosperity and decadence of the Roman Campagna as a result of variations in the incidence of malaria.

RUTILIUS NAMATIANUS has already been cited as a responsible official witness to the existence of harmless marshy places in the Tiber delta in A.D. 416, and then SIDOINUS, another official, sixty years later, reports himself a sufferer from fever and pestilential air. Afterwards from the 6th to the 8th centuries there are GREGORY and HILDEBERT of Tours and FRODOARD of Reims writing openly of the baneful consequences of inundations of the Tiber. Writers of more recent times repeat the sad tale of decadence, sterility, depopulation, and fever of the Roman Campagna as if it were even then notorious. Among writers of distinction are, in the 16th century, MONTAIGNE; in the 17th century, TOUVIER; in the 18th century, the Dominican Friar LABAT, the Franciscan JACQUIER of high authority, Cardinal LATTIER; and MONTESQUIEU who noticed the concurrence of insects and sickly vapours in summer. Among the many writers in the 19th century we may select CHATEAUBRIAND, who, while giving a wonderful picture of the utter desolation and woe of the Campagna, cynically assigns it to the popes as a deliberately devised foil to the splendour of the Eternal City; DUREAU DE LA MAILLE, who reviewed the history of malaria in the Campagna; BERTHIER, particularly recommended for his *Chronique du Monastère de Saint Sixte et de Saint Dominique*; and the papers by DE LA BLANCHÈRE published in the first years of the *Mélanges de l'Ecole Française de Rome*. [References to these and many other works cited by the author are to be found in footnotes.] Eight pages, not of such pointed interest as those on the self-effacing monks, are given to "the heroes and victims of the climate of Rome and its Campagna."

We are not left to suppose that after the ruin of the monastery of Marmassola in the early years of the 14th century and the frustration of the hopes of the devoted Cistercians the sullen marshes of the Roman littoral were left entirely to the attention of curious explorers and chroniclers and the Muse of Tragedy. At Ostia in the latter half of the 15th century a French prelate, Cardinal D'ESTOUTEVILLE, "effected important works of reclamation." In the middle of the 18th century the abbé RICHARD was busy with various plans for the cultivation and repopulation of the Campagna. Moreover many of their sanctuaries and monastic buildings have out-lived the Cistercians even to the present day—and are here depicted). Among them is the Abbey and Monastery of the Three Fountains already mentioned, which was the first gift of the papacy (INNOCENT II) to the Cistercians when they first set foot in the Holy City. This ancient sanctuary seems still to be well preserved, and in the middle of the 19th century it was the home of a small band of French Trappist monks in a desperate attempt to drain and colonize the country around it. Many of these monks died of malignant fever, and after 1870 the survivors, all in broken health, had to give up and forsake the attempt.

So, from the monks of Cluny at the end of the 10th century and the Cistercians in the middle of the 12th century to the Trappists of the middle of the 19th century, "France has not ceased to send a succession of colonists to spend their energy upon the pestilential territory of Rome"; and for these missionary efforts in the Middle Ages Madame Celli thinks that the names of St. ODO abbot of Cluny, St. BERNARD the famous abbot of Clairvaux, and Pope CALIXTUS "deserve to be inscribed in letters of gold" in the scroll of History.

Leaving the devoted labours of the monks, and the interesting records of the chroniclers, we come, finally, to schemes and attempts of comparatively modern times and inspired not by religious zeal but by enterprising French engineers or by French capital. The author mentions Claude BAYON and engineers LINOTTE and FROYER, who between 1824 and 1856 did some ameliorative work at Ostia and made projects for more, and LITARD who in 1828 proposed to drain and repopulate the Roman Campagna but at a cost that was prohibitive. But before all these the Emperor NAPOLEON in 1810 had expressed his anxiety to have the causes of the decadence of the Campagna investigated and remedied.

In reviewing the great schemes of Napoleon the author draws on the *Études statistiques sur Rome et la partie occidentale des États romains* of Count Tournon (Paris, 1831) where its comprehensive character is revealed. The record of this magnificent enterprise is as follows: In Rome a lake near the Villa Borghese was drained, stagnant waters around the Forum were led away by reopening the Cloaca Maxima, and the construction of a series of quays along the Tiber for protection against flooding, at a cost of 4 or 5 million francs, was projected. In the environs of the city half-a-million francs were given for plantations of tobacco, indigo, cotton and rice. In the Campagna orders were issued for the planting of trees along the roads, cultivation was extended, and merino sheep were introduced; but colonization was regarded with one auspicious and one dropping eye, since all the colonists of a party of Germans settled and housed there by the MATTEI family died in the course of one year. Substantial grants were made annually to Civita Vecchia, Porto d'Anzio, and Fiumicino. A great work of canalizing the Pontine Marshes was started, by which about a

fourth part of their area was recovered for agriculture ; and a project for draining the Maccarese was considered.

[This is a very interesting paper and valuable also for its ample bibliographic footnotes. The author does not think it necessary to remind us that St. BERNARD was considered to have been the greatest man of his time in Christendom. He was not only the incarnation of rigid piety and inflexible determination, the moving spirit of a powerful reformation, and the man whose zeal roused Christian chivalry to the second Crusade, but he must also have been, more than a century before Friar Roger Bacon (and centuries before Shakespeare's good Duke in *As you like It*), a man of scientific insight. For it was St. BERNARD who instructed an inquiring pupil to study Nature before everything—"you will find something far greater in the woods than you will in books ; stones and trees will teach you that which you will never learn from masters" were his words. Therefore we may be sure that it was no mere visionary zealot that set the French Cistercians to hard labour on the Roman swamps.]

The reviewer would like to add that within a reasonable distance from York there are two singularly beautiful ruins, Fountains Abbey and the abbey of Rievaulx, that bear witness to the excellent taste of the Cistercians in their choice of a site alike fascinating and exempt from public haunt, and to their masterly attributes as architects and masons.]

A. Alcock.

CELLI-FRAENTZEL (Anna). *La febbre palustre nella poesia.* (Da Virgilio a D'Annunzio.) [**Malaria in Poetry.**—Supplement to *Riv. di Malarologia*. 1930. Vol. 9. 33 pp. [63 refs.]]

In this small pamphlet the author has collected a number of extracts referring to "paludal fever" under one term or another from Virgil to D'Annunzio. Virgil leads the way with "malattia estiva" taken from the *Aeneid*. Most of the poets are content to curse malaria as "la Febbre" and D'Annunzio writes of "Unica dea, la 'Febbre.'" It is called "cotidiana" by Terence and frequent allusions are made to the dreaded "terzana." The poets suffered from malaria and saw clearly the evil influence of the disease on their country and peoples ; an enemy to health and prosperity. In the earlier years they knew not the true cause, but they saw clearly that malaria was connected with swampy and undrained lands. They also grasped firmly the fact that drainage and cultivation of such areas diminished the amount and spread of "paludal fevers." The very names malaria and "paludism" come from Italy. The later poets quoted had learned the true cycle of causation and on page 32 we find Giovanna Cena's poem : "Le Zanzara," the mosquito.

J. H. Tull Walsh.

Ross (Ronald). **Two Ross-Manson Letters.** [Prefatory Note dated Nov. 2, 1929, followed by two letters dated Secunderabad, Aug. 22 and 31, 1897, and an extract from the *Lancet*, Nov. 2, 1929, p. 927, reporting Dr. G. Carmichael Low's Presidential Address to the Royal Society of Tropical Medicine, October 18th, 1929.]—12 pp. With 1 diagram. 1929. Putney Heath : Ross Institute & Hospital for Tropical Diseases.

Sir Ronald Ross tells us in "The Prefatory Note" that the correspondence with MANSON, LAVERAN, Lord LISTER and possibly some

others will shortly be published in full. In the meanwhile we get in this slim pamphlet—with a very long title—two letters written in 1897 to MANSON from Secunderabad. The first letter describes the finding of zygotes in the "brown" mosquitoes which were subsequently identified as *Anopheles*, probably *A. stephensi*. A portion of this letter, dated August 22nd, containing original drawings of malaria zygotes is given as a photograph (p. 6). Experiments with "brindled" mosquitoes (*Stegomyia*) are also described in which the zygotes were not found. The work done on August 23rd and 24th is included in the letter. From the second letter dated August 31st, we gather that specimens sent to MANSON had gone bad; but Ross writes: "I really believe the problem is solved, though I don't like to say so. I look at my cells daily; those of the fifth day have grown bigger than those of the fourth day: such bodies are not found normally among the elementary cells of the mosquito's stomach (which are alike in all species of course) they have yet been found only in malariated mosquitoes; above all they contain the characteristic pigment peculiar to the malaria bug."

These letters are of historical interest, but they do not reveal anything new, anything that has not been published by Sir Ronald Ross in his "Memoirs," "Studies on Malaria," "Researches on Malaria" (Nobel lecture Dec. 1902), etc.

The extract from the *Lancet* report of Dr. G. Carmichael Low's Presidential Address is considered by Ross to be "probably the best brief account ever published in English of my Indian work."

J. H. Tull Walsh.

SEQUEIRA (James H.). **Alphonse Laveran and his Work.**—*Kenya & East African Med. Jl.* 1930. Feb. Vol. 6. No. 11. pp. 319–330. With 1 text fig. [8 refs.]

An interesting account of its distinguished subject with a reproduction of LAVERAN's original drawings of malarial parasites.

A. G. B.

THOMPSON (C. J. S.). **The History and Lore of Cinchona.**—*Brit. Med. Jl.* 1928. Dec. 29. pp. 1188–1190. With 1 text fig.

A most interesting story beginning in legend, continuing with the discovery of cinchona bark at the beginning of the 17th century and its introduction to Europe by the Countess of Chinchon and ending with the isolation of its thirty alkaloids. It cannot be extracted, but attention may be drawn to a few points. It is said that the natives of South America were quite ignorant of the medicinal qualities of the bark and that it was never one of the medicines carried in the wallets of the native itinerant doctors (MARKHAM). However, when LEDGER obtained through a native servant some seeds of *Cinchona calisaya*, seeds which were the foundation of the great Javan industry, owing to the jealousy of the natives he [the servant] was so ill-treated that he died from the effects. Again at Loxa, near which town the first knowledge of the drug was obtained, the natives would rather die than have recourse to such a dangerous remedy (HUMBOLDT), while SPRUCE says it was difficult to persuade the people of Ecuador and Colombia that their red bark could be of any service beyond that of dyeing cloth. Quin-

quina, the author points out, means "bark of barks" which suggests that some special value was attached to it.

The later history of cinchona is bound up with the career of the apothecary Robert TALBOR (or TABOR) who was knighted by Charles II, and whose reputation was made by the use of his secret remedy, the active part of which was "Jesuit's powder" as the bark was then called. The formula published after his death showed that it consisted of an infusion of the bark in claret wine, macerated for many days, and a tincture in spirits of wine which is of "practically the same strength as the tincture of cinchona of the British Pharmacopoeia to-day." For this formula, not to be published till after TALBOR's death, Louis XIV gave 2,000 louis d'or and an annuity of 2,000 livres.

A. G. B.

DAWSON (W. T.). **Cinchona Alkaloids and Bark in Malaria.**—*Internat. Clin.* 1930. June. (40 ser.). Vol. 2. pp. 121-149. [63 refs.] Also in *Jl. Roy. Army Med. Corps.* 1931. Mar. Vol. 56. No. 3. pp. 178-201. [63 refs.]

The author has collected many interesting additional details of the well-known stories in the history of cinchona. The principle source of the bark is Java, where the Dutch have cultivated the beautiful, blossoming, ledgerian variety of an originally Bolivian tree, *Cinchona calisaya* (yellow bark), by grafting it upon the hardier *Cinchona succirubra* (red bark). The name "ledgeriana" commemorates Charles LEDGER, who, in 1865, shipped a packet of seeds from Peru to London. The seeds were obtained by Mr. Ledger's old servant, Manoel, who spent four years collecting them in the forest; on his return to Bolivia he was so ill-treated, for having harmed the industry of the bark collectors, that he died. Mr. Ledger gave all that he obtained from the sale of the seeds, £100, to Manoel's widow. It is not known whether the Peruvians used cinchona bark, but in 1630 Don Lopez Canizares, the corregidor of Loxa, now a district of Ecuador, was cured of a fever by the bark, and in 1638, hearing of the illness of Ana de Osorio, wife of the Count of Chinchon, Viceroy of Peru, Canizares forwarded to the Palace at Lima, 600 miles distant, a parcel of the bark, which her physician, Don Juan DE VEGA, used to cure her tertian fever. The next year it was used in Spain. In 1670 the Jesuits forwarded some to Cardinal Joannes de Lugo in Rome, where it became known as "cardinal's bark." In Brussels and Antwerp it was called "Jesuits' powder," because the Jesuits gave it to the poor who suffered from quartan fever. They administered it as a powder, but a little later TALBOR discovered the virtues of an infusion of the bark in port wine, and Louis XIV purchased the secret of his specific at a large price. Cinchonine, the first of the alkaloids to be separated from the bark, was discovered in 1810 by GOMEZ, a Portuguese naval surgeon. PELLETIER and CAVENTOU isolated quinine in 1820.

The Government of the Madras Presidency was advised, in 1866, by Dr. SHAW, Medical Inspector General, to set up a commission to test the efficacy of cinchonidine, quinidine and cinchonine as cures for fevers, in order that it might be determined if it was worth while cultivating cinchona trees which were rich in them. The firm of Howards prepared the sulphates of these alkaloids, and also of quinine, for the purpose, and they were tested on between three and four thousand patients, with the result that "cessation of febrile paroxysms" occurred in about

98 per cent. of the cases, by whichever drug they were treated. The commission found quinine and quinidine to be of equal value, cinchonidine only slightly less efficacious, and cinchonine the least valuable. The commission's results were obtained by a compilation of reports from 26 medical officers. This report received little circulation and was lost sight of for many years. Mr. Dawson next reviews the more recent work of MACGILCHRIST (1915), ACTON (1920), FLETCHER (1923), SINTON and BIRD (1929), which does little more than confirm the work which the Madras commission carried out sixty years before, except perhaps that the more recent inquiries have shown that cinchonine (which was used extensively in Italy during the quinine shortage of the war) is but little inferior to quinine, and is not more toxic than that drug.

W. Fletcher.

KERBOSCH (M.). **Cinchona Culture in Java : its History and Development.**—*Proceedings of the Celebration of the Three Hundredth Anniversary of the First Recognised Use of Cinchona. Held at the Missouri Botanical Gardens, St. Louis, October 31–November 1, 1930.* pp. 181–209. 1931. St. Louis, Mo., U.S.A. Also in *Genesck. Tijdschr. v. Nederl.-Indië*. 1931. Apr. 1. Vol. 71. No. 4. pp. 317–344. With 1 text fig. & 4 plates. [4 refs.]

For more than two centuries the exploitation of cinchona in its natural forests went on unchecked ; it is chiefly due to the French savant, WEDDELL, who visited the cinchona districts in 1843–1848, that efforts were eventually made to introduce the plant into other tropical countries in order to prevent its total extirpation. In 1852, a Dutch expedition under HASSKARL brought seeds and plants to the botanical gardens at Buitenzorg in Java. In 1860, a British expedition under Sir Clements MARKHAM ultimately succeeded in delivering in British India more than 450 live plants and about 100,000 seeds of *C. succirubra*, which has become of extraordinary importance as the base on which to graft the *C. Ledgeriana* varieties. In the highlands of Java there is a porous soil with much humus of recent volcanic origin. In the Preanger Regencies, on the slopes of the volcanoes and the plateaus between them, especially on the plateau of Pengalengan, the trees flourished, and it appeared as if their cultivation had a splendid future in Java ; yet, without a fortunate accident, it could never have developed and attained the great economic importance which it now possesses. When the trees were big enough to furnish sufficient bark for analysis, it was discovered with dismay that the yield of quinine in all varieties, except one, was extremely low ; and as regards the one exception, it grew so badly that it gave little bark. The total alkaloids were 2 to 5 per cent. and the quinine content between 1 and 2 per cent. Then came the "fortunate accident" : in 1865 Charles LEDGER sent a lot of seeds collected in the Rio Mamore valley of the Bolivian Province of Canpolican, to his brother in London, with instructions to sell them to the British Government. When negotiations were unsuccessful, the brother, fearing that the seeds would lose their power of germinating, sold some to the Netherlands Government, and they were sent to Java. LEDGER's remaining stock was sold to a British Indian planter who exchanged it for *succirubra* seed with the British Government. In the year 1872, the first analyses of the barks of the Ledger cinchonas were made in Java, and they yielded far more quinine than any which had been grown up to that time. Before the discovery of the Ledger barks,

those with an average percentage of 1 to 1.5 per cent. quinine were the best producers, but some samples of the Ledger bark yielded up to 8 per cent. ; this bark was also remarkable for the ease with which the quinine crystallized as sulphate, and it fetched four times the price of the old bark at the Amsterdam auctions. The yield was still further improved by taking grafts from selected trees and planting them out in isolated gardens, so that it was possible to collect seeds that were produced by the mutual fertilization of Ledgerianas with a high percentage of quinine. The Ledgeriana cuttings were grafted on succiruba bases, because these provide a strong root system, can develop in less fertile soil, and possess greater resistance against the dreaded root fungus.

The first 20 years of cinchona planting in Java, before Ledgeriana came into bearing, were financially a failure ; it was looked upon as an expensive hobby of the Government, the public frequently expressed their dissatisfaction, and no private companies could be induced to take it up. The discovery of the Ledger cinchona changed all this ; private enterprises became interested, the Government supplied seeds and cuttings without charge, and, in a short time, there were many private plantations. The result of successful cultivation was overproduction, and a tremendous fall in prices which made profitable exploitation impossible. The Ceylon planters cut down their trees, dumped large quantities of bark on the market, and planted tea instead. The more scientific cultivation in Java enabled it to resist the strain. The cinchona bark monopoly in the Dutch Indies has grown exclusively by the survival of the fittest ; never has the Government tried to maintain this monopoly by special laws, they have always been ready to supply selected seeds and plants to other countries, and the whole world owes a debt of gratitude to Java for persevering in the cultivation of cinchona in spite of the unfavourable circumstances. For the whole of humanity, the continuation of cinchona cultivation is of vital importance ; it must be economically possible or it may be abandoned as it was in Ceylon.

The cinchona planters have attempted to preserve an economically profitable cultivation by means of the Cinchona Agreement. Formerly, the quinine manufacturers, who were united, practically dictated the price of the bark, and they kept a very wide margin between this and the price which they charged for quinine. At last, the planters organized themselves, and, after a long fight, the Agreement of 1913 provided a proper basis of co-operation between the producers and the manufacturers. The correct execution of the Agreement is intrusted to the Kinabureau in Amsterdam, which consists of six representatives of the planters and six of the manufacturers. The Government subscribed, but made it a condition that they would surrender their membership if they found that the Agreement formed an impediment to the supply of cheap quinine to malarial districts. As the Government, through its own plantations, controls about 10 per cent. of the entire production, the Agreement could not stand without them. It will be clear then that there is no question of a " trust " arising from a desire to exploit a monopolistic position by forcing up prices. Without the Cinchona Agreement, quinine would become a speculative article in the hands of middlemen, as it was in the past before the war ; in fact, without the Cinchona Agreement, the supply of cheap quinine to malarial districts would be by no means assured.

W. Fletcher.

MIDDLETON (William S.). **The Yellow Fever Epidemic of 1793 in Philadelphia.**—*Ann. Med. History.* 1928. Dec. Vol. 10. No. 4. pp. 434–450. With 3 text figs.

A few points of interest emerge in this rather dull account of an overwhelming epidemic of yellow fever in Philadelphia.

The whole year before the outbreak had been unseasonably warm and dry. Infective cases seem to have arrived by sea in July and August. The first local case occurred on August 5th. There was a downpour of rain on August 25th, and thereafter practically none until October 15th, when the epidemic was abating. Indeed, it seems a pity that this record makes no suggestion regarding the breeding places of *Aedes* at a time when "springs and wells failed. The dust in the roads reached a depth of two feet. The pastures burned out and apples and pears shrivelled on the trees."

The medical men of the city were very sharply divided into those led by RUSH who maintained that the pestilence was of local origin from the emanations of putrifying matter and those, represented by the College of Physicians, who believed the disease imported. The conflicting views were maintained by their respective supporters with considerable acrimony.

RUSH was a remarkable man. He worked heroically throughout the epidemic and is said to have survived two attacks of yellow fever. In treatment he used venesection and the "ten and ten" formula of YOUNG, i.e., 10 grains calomel and 10 grains jalap, the latter because the action of calomel alone was too slow! The controversy over the origin of the 1793 yellow fever led to RUSH's resignation from the College of Physicians.

Everyone, including RUSH and the College, seems to have ignored the following which appeared in the *American Daily Advertiser* of August 29th.

"As the late rains will produce a great increase of mosquitoes in the city, distressing to the sick, and troublesome to those who are well, I imagine it will be agreeable to the citizens to know that the increase of those poisonous insects may be much diminished by a very simple and cheap mode, which accident discovered. Whoever will take the trouble to examine their rain-water tubs, will find millions of the mosquitoes fishing(?) about the water with great agility, in a state not quite prepared to emerge and fly off: Take up a wine glass full of the water, and it will exhibit them very distinctly. Into this glass pour half a teaspoonful, or less, of any common oil, which will quickly diffuse over the surface, and by excluding the air, will destroy the whole brood. Some will survive two or three days but most of them sink to the bottom, or adhere to the oil on the surface within twenty-four hours. A gill of oil poured into a common rain-water cask, will be sufficient: large cisterns may require more; and where the water is drawn out by a pump or by a cock, the oil will remain undisturbed, and last for a considerable time. Hickory ashes have been tried without effect."

J. F. C. Haslam.

HARE (Hobart Amory). **Stephen Girard and the Great Epidemic of Yellow Fever in 1793 and the Lesser Outbreaks in 1787, 1798, 1802 and 1820.**—*Ann. Med. History.* 1930. July. New Ser. Vol. 2. No. 4. pp. 372–382. With 3 text figs.

Stephen GIRARD was a wealthy merchant of Philadelphia who in the great epidemic of yellow fever in 1793, when everyone who could, fled

from the city, volunteered to nurse the sick, and converted the hospital from a place of neglect and terror into a well-organized institution where the sick were well cared for. He founded Girard College. The author quotes at length from Matthew CAREY.

A. G. B.

PLAZY. Du rôle des médecins de la marine dans l'étude de la fièvre jaune. [**The Part played by French Naval Medical Officers in the Study of Yellow Fever.**]—*Arch. Méd. et Pharm. Nav.* 1930. Apr.-May-June. Vol. 120. No. 2. pp. 245-261.

In this inaugural lecture of the course "de l'école d'application" at Toulon (January 1930) Dr. Plazy gives to the students an interesting account of the early writings of French naval doctors on yellow fever. He states that CORNILLAC and BÉRENGER-FÉRAUD make short work of the hypothesis of its African origin. The disease, they say, did not appear in Senegal till relations between the Old and New Worlds were established. The latter author anticipated the fear that the piercing of the Isthmus of Panama would introduce yellow fever into the Pacific. Many of the early observations were not explicable till the discovery of the part played by the mosquito, e.g., that the zone in which the disease spread lay between 48°N.L. and 42°S.L., the optimum temperature for epidemics being 25°; that yellow fever did not occur in Brazil above 700 metres, but was found at Caracas at 1,000 metres; the pernicious influence for ships of a breeze off the land. The special receptivity of the white race was noted [but the observation that 500 Nubians sent to Mexico from Egypt remained well when the Mexican and white troops were decimated by yellow fever is not easily explained]. Their clinical descriptions, he says, have never been surpassed.

In the first French treatise, that of DE LA MARTINIÈRE of Martinique which appeared in 1703, the disease was described as contagious and for more than a century it was designated "la contagion," but later there were desperate contests between the contagionists and non-contagionists. CHARVIN, who was of the latter, proved his point by swallowing blood vomit and smearing it on his body, but his opponents quoted Surgeon-Major CONAN who gave up his cabin to a lady with yellow fever, imprudently returned to it on the 3rd night after her death and fell ill next morning. Naturally the traders were strong non-contagionists. Lastly we have tales of heroism, not peculiar to the French, that of the doctor who, realizing the nature of his illness shut himself in his cabin and refused all help, and that of another who stricken the same time as his friend, attended and treated him and noted down his symptoms, himself succumbing the next day.

A. G. B.

BIRD (Jorge). **The Conquest of Yellow Fever.**—*Bol. Asoc. Med. de Puerto Rico.* 1930. Dec. Vol. 22. No. 183. pp. 249-256.

The following extracts from Dr. Bird's paper illustrate the influence of tropical disease on history:—

"Yellow-Fever has played an important part in the political history of some of the countries situated along the Caribbean Sea. The fact that the island of Puerto Rico is actually American and not British is practically

due to an outbreak of Yellow-Fever. In 1598, when Puerto Rico was a Spanish colony Lord Cumberland attacked San Juan, the capital of the island, with a British fleet and succeeded in capturing the city. San Juan remained under Lord Cumberland's rule during five months. Lord Cumberland was just planning to make a British colony out of the island when a frightful epidemic of Yellow-Fever broke out among his troops and he was forced to leave the island.

"Haiti owes its independence practically to an epidemic of Yellow-Fever. The Haitians rose in arms against the French just as Napoleon was planning to use Haiti as a base for the colonization and fortification of the territory of Louisiana. Napoleon sent some of his best troops to subdue the country but they met with a stubborn resistance and, when an epidemic of Yellow-Fever broke out among the troops the French were forced to leave the country. It was the irony of fate that this defeat of the French at the hands of the blacks came at a time when the all-mighty Napoleon was at the peak of his glory in Europe."

A. G. B.

SCOTT (H. Harold). **Charles Finlay, Pioneer.** [Correspondence.]—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1929. Apr. 25. Vol. 22. No. 6. pp. 541-543.

Apropos of Dr. HINDLE's "Experimental Study of Yellow Fever" (1929), Dr. Scott writes that far from sufficient credit has been given to the work of FINLAY. In 1881, nearly 20 years before REED and CARROLL, FINLAY enunciated his theory of an intermediary transmitting agent of yellow fever and suggested a mosquito which had "on the corselet a combination of lines in the figure of a 2-stringed lyre" and was described as *Culex fasciatus*. He found by experiment that the disease was thus transmissible by bites in the early days—he thought up to the fifth day. He started making immunization experiments as early as 1884 and states that between 1881 and 1891 he had a record of 67 persons experimentally inoculated by what he calls contaminated mosquitoes, with only one death. Dr. Scott remarks that he was lucky. The figures quoted show that of 33 inoculated none died of yellow fever, whereas of 32 not inoculated 5 died. [With all credit to FINLAY his contemporaries were perhaps justified in considering the matter unproven, and it may be remarked that NOGUCHI's immunization figures show the risk of trusting what appear to be well-nigh conclusive results (see this *Bulletin*, Vol. 26, p. 305 (footnote)).]

A. G. B.

VAN DONINCK (A.). Tractaeten vande peste vóór de 18de eeuw in Vlaanderen. [**Treatises on Plague before the 18th Century in Flanders.**]—*Nederl. Tijdschr. v. Geneesk.* 1930. July. 5. 74th Year. 2nd Half. No. 27. pp. 3431-3441. [6 refs. in footnotes & 15 further refs. to Flemish plague literature of 17th century.]

Plague has raged over Europe from the earliest Roman times and was originally called the Justinian plague. Its symptoms, especially the occurrence of the bubo and of lung symptoms, were well recognized even by writers of the 14th century, although there was some tendency to call all raging epidemics by the name of plague. Much was written on the subject in the last half of the 16th century and the beginning of the 17th. Although emphasis is laid upon the fact that the disease

was essentially a manifestation of the anger of God, medical works deal chiefly with a more proximate causation than the *ira coeli propter peccata* and put forward recommendations for both prevention and treatment. General agreement existed that the disease was greatly influenced by dirt and by badness of food. Prevention is advised as the most important means of combating the disease. It is the air which is fouled in plague. Purification, therefore, may be effected by kindling large fires and by destruction or neutralization of putrefactive effluvia. Evacuation of infected houses is recommended where possible. Avoidance of constipation is an important prophylactic measure, but the use of laxatives and the resort to blood letting are also favoured as curative measures in order to cleanse the sick humours. A special antiplague measure recommended by GHERING and other writers is the wearing of the precious stone, the hyacinth, pressed over the heart. Careful regulation of the daily life and dietary, attention to slight indisposition, avoidance of constipation, blood letting if the body condition requires it, disinfection of houses, cleansing of streets, removal of stagnant water, the prohibition of large gatherings of the populace, fairs and dance parties are among the definitely specified measures of prevention. As plague is an astral disease of subtle, spiritual, penetrating poisonous causation, it is advisable, says LAZARUS MARQUIS, to use some subtle spiritual medicament in the treatment of plague. That which he recommended possessed the name of *aqua theriacalis anti-pestifera*. It was a sudorific containing a multitude of ingredients and could be given along with cordials. The recommendations of writers like JACOBUS GHERING, JAN BOECKELIUS, MARQUIS LAZARUS and others are in some instances still as sound today as they were then: in other cases, as is only to be expected, they reflected the notions and superstitions with regard to disease and its cure which were prevalent at the time. By the year 1664 plague had disappeared from the Netherlands although it continued to manifest itself in England to about 1688 and in France to 1720.

W. F. Harvey.

- i. HELLINGA (G.). De Amsterdamsche pesthuizen. [**Amsterdam Pest Houses.**]—*Nederl. Tijdschr. v. Geneesk.* 1928. Dec. 1. 72nd Year. 2nd Half. No. 48. pp. 5912–5938. With 9 figs. (1 double plate). [Refs. in footnotes.]
- ii. ——. Het pesthuis na den brand (1732 tot ongeveer 1839). [**The Pest House after the Fire (1732 to about 1839).**]—*Ibid.* 1929. Jan. 5. 73rd Year. 1st Half. No. 1. pp. 35–62. With 9 figs. [Refs. in footnotes.]
- iii. PENNING (C. P. J.). Het vroegere pesthuis te Harderwijk. [**The Former Pest House at Harderwijk.**]—*Ibid.* Aug. 3. 73rd Year. 2nd Half. No. 31. pp. 3569–3571.
- iv. EMCK (W. F.). De voormalige pesthuizen te Gorinchem. [**The Former Pest Houses at Gorinchem.**]—*Ibid.* pp. 3571–3574. [2 refs.]
- v. HELLINGA (G.). Een en ander over de overeenkomsten, aangegaan gedurende het tijdvak 1651–1699 tusschen regenten van het Amsterdamsche St. Pieters gast-en pesthuis en cureerders. [**Contracts between the Directors of St. Peter's Hospital and Pest House at Amsterdam and Therapeutists during the Period 1651–1699.**]—*Ibid.* Sept. 7. 73rd Year. 2nd Half. No. 36. pp. 4141–4146. [2 refs.]

i. Plague hospitals were already in existence in Amsterdam before the beginning of the 16th century as mention is made of a "New Pest-

House " having been built in the year 1500. Additional buildings were required owing to the severe epidemics of plague in 1557 and 1617. In 1630 the pest-house which was showing signs of decay was evacuated and used for dwelling houses and another building was erected to contain 340 patients. In 1658 a small hospital was built for the reception of smallpox patients and additional accommodation was provided about the same time in a canal boat. The so-called pest-houses were at first used for the reception of plague patients only, but subsequently persons suffering from other affections, such as mental disorders and venereal disease, were also admitted.

ii. On April 14th or 15th, 1732, the plague house erected in 1630 was burnt down and another was rapidly erected on the same site. Improvements were made in the water supply and lighting. It is noteworthy that humane treatment of the insane commenced earlier in the Plague House at Amsterdam than in any other country.

iii. The pest-house at Hardewijk which was founded in 1515 consisted of an oblong shed, divided the following year into two parts, in one of which the attendants lived while the other was occupied by those suffering from plague and other infectious diseases.

When the monks were expelled from Hardewijk their church was made to serve as a pest-house. The exact date of this event is not certain, but was probably between 1585 and 1602.

iv. From 1348 to November 1667 when the last case occurred in the town, Gorinchem suffered from epidemics of plague with intervals of varying duration. Syphilis first appeared in the town in 1497 and the sweating sickness in 1529. A building was purchased by the town council in 1523 for plague patients and was demolished in 1572. Emck was unable to find where plague patients were treated after that date until 1602 when a new house was built and served for the reception of plague patients until 1681. From then until 1783 it was only used for the treatment of the insane.

In 1783 patients suffering from putrid fever were admitted and in 1813 cases of children's diseases. In 1827 the pest-house was converted into a military hospital.

v. In the second half of the seventeenth century in addition to the regular physicians and surgeons there was a class of persons who took an active part in the treatment of certain diseases, but did not undertake any operation without first making a contract with the directors of the hospital. Their special function was to cut for stone or undertake the treatment of syphilis. There were also persons belonging to this class who claimed to cure blindness and deformities. In 1742, however, a special surgeon was appointed to the pest-house who undertook the operations formerly carried out by these unqualified persons.

J. D. Rolleston.

FLATOW (E.). Die Pest in der russischen Armee auf dem europäischen Schauplatz des russisch-türkischen Krieges 1828-1829. [**Plague in the Russian Army in the War with Turkey 1828-1829.**—*Sudhoffs Arch. f. Geschichte der Med.* 1929. Vol. 22. No. 2. pp. 151-173. With 1 map. [10 refs.]

One hundred years ago the Balkan area was not only the stage of war between Russia and Turkey, but also the scene of a serious combat between man and disease. Plague so greatly feared in the middle ages again appeared with all its horrors. The Russian Army suffered

severely and the unsanitary conditions of field service assisted the spread of the disease. In addition the Army suffered from malaria, dysentery, scurvy and tetanus. This outbreak was called by Surgeon-General WITT the "Wallachian disease" since the troops suffered badly there on the march and soldiers spread the disease in the general and field hospitals. A map is given of the region in which the war was fought, and plague met with. It is stated that since 1714 no plague had appeared in Germany, while in East and South Europe, the disease appeared now and then in certain foci: Odessa 1812, Bucharest 1813; and 1814-15 in Bosnia and Dalmatia. Until 1824 Moldavia and Wallachia were spared; but in the years following plague occurred sporadically in Wallachia. To protect Russia a quarantine line was drawn along the river Dniester. The war records contain full and painful details of the symptoms of the plague and the miserable plight of soldiers attacked while on the march or on the field of battle. There is, however, nothing new in this lengthy description taken from the medical records. The death rate in the field hospitals was from 1·8 per cent. in May 1828, steadily rising to 19·6 per cent. in December 1829. In the stationary hospitals the mortality was much greater. A list of authorities consulted is given at the end of Dr. Flatow's paper.

J. H. Tull Walsh.

KLEINE (H. O.). Der Schwarze Tod in Avignon. (Zur Erinnerung an den vor 600 Jahren in Europa erfolgten Einbruch der Pest.) [**The Black Death at Avignon. Commemoration of the Outbreak of Plague in Europe 600 Years ago.**—*Deut. Med. Woch.* 1931. June 5. Vol. 57. No. 23. pp. 988-989.]

A sketch of Avignon in the epidemic of 1361 and of the last hours of the papal physician Guy DE CHAULIAC, who succumbed to plague.

A. G. B.

LABERNADIE (V.). De l'ancienneté de la lèpre d'après les Védas. [**Antiquity of Leprosy according to the Vedas.**—*Bull. Soc. Path. Exot.* 1931. Mar. 11. Vol. 24. No. 3. pp. 175-176.]

JEANSELME states that the Kushta of the Rig Veda Sanhita (1500 B.C.), according to some commentators, indicates leprosy. The author has studied this question. He finds that Kushta in the sense of leprosy is only found in classical Sanskrit, i.e., towards the Christian era, and that leprosy is not mentioned in the texts before that epoch.

A. G. B.

WONG (K. Chimin). **The Early History of Leprosy in China.**—*China Med. Jl.* 1930. Aug. Vol. 44. No. 8. pp. 737-743.

In Chinese literature the earliest reference to leprosy is in the Chow dynasty, sixth century B.C., where one of Confucius' disciples was said to be a leper and died of his disease. HIRSCH and others believe that Pai Niu, as he was called, suffered only from scabies. It is a question of the precise significance of similar Chinese words and the author, after giving a list of 15 synonyms with the period in which they were employed, concludes that Pai Niu was undoubtedly the first leper of Chinese literature. Not, however, of medical writings, for if the "Nei Ching"

is attributed to its real author leprosy was known in China over five thousand years ago; four quotations are given from this treatise. Another passage is given from a book of the fourth century A.D. "The first symptoms of 'lai ping' are numbness of the skin or a sensation as of worms creeping. The eyesight is blurred, and there are dark scaly patches" and in Chao's "Pathology," a work published in A.D. 610, the System of Medicine of the time, there is a long account of the symptoms, with descriptions "so comprehensive that they include a variety of other skin diseases." Later, in the "Golden Mirror of Medicine," among the causes enumerated for infection by contact with lepers are mentioned unclean privies, houses, bedding, etc. From the earliest times leprosy has always been classified as a distinct disease, and has never been confused with syphilis or tuberculosis. Chaulmoogra oil is mentioned in the fourteenth century and its preparation is described. The Chinese believe that leprosy can be cured or at least modified by transmitting it to others through sexual intercourse, the poison being diminished in proportion to the number of victims.

A. G. B.

JEANSELME (E.). Comment l'Europe, au moyen age, se protégea contre la lèpre. Rapport présenté au VIII^{me} Congrès International de l'Histoire de la Médecine (Rome, 22-27 septembre 1930). [**How Europe protected itself against Leprosy in the Middle Ages.**]—*Bruxelles-Méd.* 1930. Sept. 21, 28 & Oct. 5. Vol. 10. Nos. 47, 48 & 49. pp. 1293-1295; 1324-1327; 1355-1357. [28 refs.]

Jeanselme holds that the general extinction of leprosy in Europe was due mainly to the isolation of those affected. Commencing with an edict promulgated in Lombardy in A.D. 643, he gives long lists of ecclesiastical, regal, and municipal ordinances, covering some 900 years, which were framed with the object of preventing contact between the leprous and the clean. It will occur to the critical reader that a system of prophylaxis which took nearly a thousand years to accomplish the aim of those who devised it, can hardly be considered satisfactory; or else that the various statutes cited were never really enforced, and so the disappearance of leprosy must have been due to some other cause. The mere presence of a law in a statute-book is no proof that anyone heeds it, as witness the excellent health laws in certain tropical countries to-day, and the appalling insanitary conditions which exist notwithstanding.

Elaborate enactments of the type quoted by the author had no place in the statutory law of England. Seemingly the only means of securing the removal of a leper in this country was for the aggrieved person to obtain a writ *De Leproso Amovendo*. But this applied only to a leper who resided in a town and who persisted in forcing himself into assemblages and gatherings "to their annoyance and disturbance." If he refrained from outrages of this kind he could not be removed from his house. There is little evidence of any strict segregation of lepers. Even the inmates of leper-hospitals systematically visited towns for the purpose of begging, and in certain localities they could exact toll of all corn and bread sold in the market, or, as in Shrewsbury, take a handful of corn from every sack offered for sale. The rules of the Sherburn leper-hospital, for example, expressly permitted the inmates

to receive visits from their friends, and such visitors as came from a distance were allowed to remain all night. Moreover the final punishment laid down for contumacious inmates was expulsion from the hospital. The records of St. Julian's leper-hospital, St. Albans, show that lepers could refuse to submit to isolation, for their unwillingness to lead a subjugated life is given as the reason of the shortage of patients in 1344, when it is stated that commonly there were no more than three inmates, and sometimes only one. The curious wording of the well-known edict of 1346 which ordered the expulsion of lepers from London indicates that the "absolute and strict segregation" of lepers, alleged by some modern writers, had no existence in fact. The preamble of the order declares that the lepers, *inter alia*, "by carnal intercourse with women in stews and other secret places, detestably frequenting the same, do so taint persons who are sound, both male and female, to the great injury of the people dwelling in the city aforesaid, and the manifest peril of other persons to the same city resorting." The relief resulting from this belated measure can only have been temporary, for several other expulsion orders were issued subsequently, each proving that its forerunner had failed in its object.

Yet in spite of this promiscuity of intercourse, leprosy diminished in England and finally disappeared. The extent of the disease at its worst the reviewer believes to have been only a tithe of what is often represented. This aspect of the question is too complicated to discuss here, and it is sufficient to mention that we read of "temporary leprosy," and of "lepers" who were cured by the application of sulphur, and by inunctions of mercury. But it is indisputable that the heterogeneous collection of ailments generally labelled as leprosy in old times, included some proportion of sufferers from infection with Hansen's bacillus. Leprosy in the main is a class disease, and so close was the association in people's minds of leprosy and want, that the words "leper" and "lazar" sometimes merely meant beggar, without any signification of disease. For this reason we find Chaucer using the odd term "sike lazars" to make it clear that he did not refer to lazars who were whole. The long series of recurring famines recorded by the old chroniclers shows that the poorer English can seldom have been far above starvation level, and so there was always soil fit and ready for the seed of infection, and the reviewer believes that the extinction of leprosy in England resulted from a gradual process of what today in another connexion is called bonification. He believes, too, that any community which, in a relative sense, "gets rich" will at the same time shake off "that abominable blemish, the foul contagion of leprosy."

W. P. MacArthur.

VOGT (O.). Die Basler Cholera-Epidemie vom Jahre 1855. [**The Basel Epidemic of Cholera in 1855.**—*Schweiz. Ztschr. f. Hyg.* 1929. Vol. 9. No. 12. pp. 830-847. [5 refs.] [Basel-Stadt Canton Health Office, Basel.]

After some remarks on Asia as the home of cholera and about KOCH's discovery of the cholera vibrio in 1883 the author notes that in the European pandemics of 1846-1862 Basel was included in the visitation. In the years 1854 and 1855 the disease was very severe in south and western Europe. The first case in Basel occurred on July

27th, 1855 in the person of a mechanic who worked in what is the Rümelinbachweg and lived in the Rappoldshof in "Little Basel." It cannot be accurately known how the infection was introduced. A second and a third case came from the same factory during the following two days. On August 5th, cholera appeared in Little Basel in the house where the first patient had lived. It does not seem necessary to follow the succeeding dates and cases. Full information is given, both of morbidity and mortality, from July 27th to October 1st, 1855, in a chart on p. 833. Three hundred and ninety persons were attacked, and 205 died. Statistics are given showing death rates according to age; the town, river and canals (with plan) are described. The sick were removed to the town hospital and the dead were buried under the control and care of the hospital authorities. Extracts are given showing the sanitary precautions taken. In 1867 Switzerland again suffered from a small epidemic.

J. H. Tull Walsh.

STICKER (Georg). Bekämpfung der asiatischen Cholera vor hundert Jahren. [**Fight with Cholera One Hundred Years ago.**—*Klin. Woch.* 1930. Mar. 29. Vol. 9. No. 13. pp. 612-616.]

The year 1830 was, for the people of Europe, one of great trouble. Asiatic cholera had been present in 1817 and during thirteen years had ebbed and flowed; but in 1829 it spread attacking Russia in a terrible manner. The rumour of its near approach caused the governments in Europe to prepare for its advent and to form laws for guidance and transport of victims of the disease and to make some arrangements for treatment. The sanitary authorities and their police organization were on guard. The cause of cholera was not then known, but it was thought that it could be contracted by contact, from fomites or from a distance. The Institute of France sent medical missions to Poland and Russia to study cholera; and in the meanwhile, the French government set on foot health-passes and quarantine. Nevertheless, Paris suffered severely in 1832. It was not only in the Paris Academy that the subject received consideration; the cholera work of Professor ENNEMOSER in Bonn is another example. In India, etc., such control as was exercised was in the hands of the English, and their consuls, who at that time despised quarantine; but cholera was fully recognized as a contagious disease. In Moscow, between September 1830 and March 1831, 250,000 persons died. Cordons with patrols were formed by the western states, but they did not fully succeed, and cholera spread so that Austria and Prussia hastened to double their cordons. On December 28th, 1830 cholera appeared in Vienna and Budapest. Although there was no specific treatment for cholera and even moderate sanitation was only beginning to be understood the countries and towns issued special rules during these epidemics. Panic was deprecated, strict cleanliness in the house enforced. Chlorine and chloride of lime were used as disinfectants. Much is said about the books and papers written at the time including one for laymen. These are of historical interest only. In 1831 in spite of all efforts cholera had spread all over Europe and reached England. It continued to prevail in 1833, 1834 and 1835. The author also mentions a severe outbreak in Munich in 1836.

J. H. Tull Walsh.

BUTLER (C. S.) & HERNANDEZ (Vincent). **Our Inheritance of Fallacy from Chapter XIV of Oviedo's *Historia General y Natural*.**—*Southern Med. Jl.* 1929. Dec. Vol. 22. No. 12. pp. 1098-1102. [17 refs.]

There are two opposing views regarding the origin of the epidemic of syphilis that afflicted Europe in the closing years of the fifteenth century. The protagonists of one party contend that syphilis was unknown in Europe until introduced from America by Columbus' sailors. These adventurers (who arrived at Pelos on March 15th, 1493), are declared to have infected the Spanish ports, whence the disease was carried to Italy by Gonzalo's Spaniards who opposed Charles VIII's army in the Neapolitan campaign, usually loosely spoken of as the "Siege of Naples." That syphilis in a severe form prevailed amongst the contending forces in this campaign seems certain, but the responsibility of the Spaniards is quite another matter.

The other theory is that the fifteenth century outbreak was merely an extension of a disease already existing in Europe, intensified in virulence and diffusive power by war, famine, and moral depravity. There is nothing inherently incredible in this view, for epidemics of syphilis, though much less widespread in their range have been recorded on many occasions since the fifteenth century, for example in East Prussia during the Seven Years' War, and in Courland following the Russian invasion in 1800.

The object of the paper here reviewed is to prove by historical facts that the syphilis recorded in France and Germany in 1495 cannot be laid to the charge of Gonzalo's Spaniards. Charles VIII with one half of his army quitted Naples for France in May 1495, but at that time the Spaniards had not yet arrived in Italy; therefore, according to the American theory, Charles' troops conveyed the disease to France and Germany before they themselves had had the opportunity of acquiring it. The authors could have strengthened this argument by pointing out that Charles' retreating forces, after leaving Naples, were detained in Northern Italy until October 1495, whereas a printed edict* of the Diet of Worms dated August 7th, 1495 shows that syphilis was then widespread in Germany and generally recognized, that is, two months before the return of the first contingent of Charles' troops. The remainder of Charles' army continued the struggle in Naples until they were forced to capitulate in July 1496, having endured the worst horrors of famine and epidemic intestinal disease.

The reviewer is of opinion that the "leprosy" of medieval times included a large element of syphilis. It is not surprising that the fifteenth century extension was generally, though not universally, regarded as a new disease, for the age accepted a similarly erroneous belief regarding the recent origin of typhus fever. The positive and repeated assertions of early medieval writers that "leprosy," in part, was of venereal origin cannot be dismissed as mere theoretical preconceptions. As CREIGHTON asks, "What are we to make of this kind of leprosy?—" *In hoc genere, causa est accessus ad mulierem ad quam*

* The "Foul pocks" (*pösen plattern*) of the original edict is translated by "*Malum Francicum*" in the Latin version issued a little later. SUDHOFF in his exhaustive researches discovered in Copenhagen an Italian manuscript, dated 1465, which contains two prescriptions entitled respectively, "*Electurio optimo al mal franzoso*," and "*Per fare siropi de mal franzoso*." These prove that the French pox was recognised and named at least a generation before the discovery of America.

accessit prius leprosus ; et corrumpit velocius vir sanus quam mulier a leproso. . . . Et penetrant [venena] in nervos calidos et arterias et venas viriles, et inficiunt spiritus et bubones, et hoc velocius mulier,' etc. Or to quote Gilbert again. 'Ex accessu ad mulieres, diximus superius, lepram in plerisque generari post coitus leprosos.' Or in Gordonio ; 'Et provenit [lepra] etiam ex nimia confibulatione cum leprosis, et ex coitu cum leprosa, et qui jacuit cum muliere cum qua jacuit leprosus.' That these circumstances of contracting *lepra* were not mere verbal theorizings inspired by the pathology of the day and capable of being now set aside, is obvious from a *historia* or case which Gordonio introduces into his text. 'I shall tell what happened,' he says ; and then proceeds to the following relation :

"Quaedam comitissa venit leprosa ad Montem Pessulanum [Montpellier] et erat in fine in cura mea ; et quidam Baccalarius in medicina ministrabat ei, et jacuit cum ea, et impregnavit eam, et perfectissime leprosus factus est.' Happy is he therefore, he adds, who learns caution from the risks of others."

Over two hundred years ago, Beckett pointed out that John of Gaddesden clearly indicates that a local lesion might preface a generalized "leprosy." Writing "de infectione ex coitu leprosi vel leprosa," this early fourteenth century physician advises " . . . post coitus statim lavet virgam cum aqua mixata aceta, vel cum urina propria et nihil mali habebit," whilst women who have run the risk of contracting "leprosy" in the like manner are counselled to wash locally with a certain alcoholic infusion. Another pre-Columbian writer, Thomas Gascoigne, also cited by Beckett, records that divers men of his acquaintance had died "ex putrifactione membrorum suorum et corporis sui" which infection had been brought about "per exercitium copulae carnalis cum mulieribus."

Due mainly to the advocacy of OSLER, and also to the uncompromising assertions in D'Arcy POWER and Keogh MURPHY'S "*System of Syphilis*," the theory of the American origin of syphilis is generally accepted by medical men in this country. In the last-named work the writer of the historical section declares, "All available statements and facts point to the last decade of the fifteenth century—particularly the years 1493-1500—as the time when syphilis first appeared in the Old World. There is not a particle of evidence to show that the disease existed in Europe before that time."

This is a hard saying.

W. P. MacArthur.

COUTTS (F. J. H.). **Presidential Address. Venereal Diseases from the Epidemiological Point of View.**—*Brit. Jl. Ven. Dis.* 1929. Jan. Vol. 5. No. 1. pp. 1-21. [17 refs.] Discussion pp. 30-37. [Summary appears also in *Bulletin of Hygiene*.]

[This address will not bear condensation. It ought to be read in the original, particularly by those who believe that syphilis did not exist in Europe before 1493 and by those who attribute all the decreases in the incidence of syphilis in recent years to the intervention of modern treatment.] The author presents evidence that syphilis was smouldering in Europe long before 1493. He suggests that the epidemic following the siege of Naples in 1494 caused people generally to believe that a new disease had appeared. [Just as influenza was thought to be a new

disease when the big epidemic of it swept through the world about forty years ago.] The decrease in syphilis may be mainly part of an epidemic cycle such as occurs in other infectious diseases. The address contains other matter of great interest which can otherwise be found only by industrious study in a well-furnished library.

L. W. Harrison.

GROS (H.). Qui introduisit la syphilis à Tahiti? [**Who introduced Syphilis to Tahiti?**]*—Bull. Soc. Path. Exot.* 1929. Jan. 9. Vol. 22. No. 1. pp. 30-34. [1 ref.]

The author's answer to the title of his paper is—It is impossible to say! The question arose in the first place owing to Captain Cook accusing the French of having infected "les belles Ōtahitiennes" with the disease. In this interesting little article Dr. Gros tries to unravel this corner of medical history associated with the voyages of Cook, Bougainville, Wallis, etc. He fails to find an answer, but suggests that the Spaniards might just as well be inculpated as the French or English, or future research may shew evidence of syphilitic disease in the bones of those who existed long before the advent of the European. At all events in the present state of our knowledge it is wrong to attribute all the ills from which the inhabitants of Oceania suffer to the influence of the European.

H. S. S.

JOURNAL DE MÉDECINE DE BORDEAUX. 1929. Oct. 10. Vol. 106. No. 26. pp. 790-796.—La médecine à Bordeaux en septembre 1829. D'après le "Journal de Médecine-Pratique" titre de notre journal, il y a cent ans. Jean Hameau, précurseur de Pasteur, découvre la pellagre. [**Jean Hameau, Discoverer of Pellagra.**]

It was in May 1829 that Jean HAMEAU read his first note, before the Royal Society of Medicine of Bordeaux, dealing with a disease hitherto unknown in France. From the masterly clinical description there is no doubt that this disease was pellagra. He states that the condition occurs at any age and in either sex, but was only observed among the poor who subsist upon a coarse diet. At first, the disease is noticed in the summer months and, lasting only a few weeks, disappears in the winter. After two or three of these attacks it becomes permanent and finally ends in death. The description of the dermatitis, glossitis, gastro-intestinal and nervous symptoms constitutes a masterpiece and clinical work since has added nothing of importance to it.

In July of the same year HAMEAU read his second paper, which gave full details of local conditions and described very fully certain cases of the disease. Particular reference was made to one Commune, viz., Teich, containing about 1,000 inhabitants engaged entirely in agriculture. The condition of these people when the harvest fails or the price of grain is low is one of the direst poverty. It is not necessary here to describe the cases, but one thing must be mentioned, namely, the extraordinary care and accuracy of a busy country practitioner, which provides an example of what progress medicine can make under conditions most adverse to research if only a degree of genius and unbounded enthusiasm are present.

It is only to be expected that such a keen and analytical intelligence as HAMEAU evidently possessed should deeply concern itself with the mystery of pellagra etiology. It is fascinating to watch his efforts in this direction, especially as we now think that the mystery has been satisfactorily cleared up. Is pellagra a disease secondary to some internal derangement? If so, it is peculiar that no premonitory signs are present. Can it be due to gastro-intestinal upset? If so, why does the disease never occur among the resin workers of the district where hardships, both dietetic and otherwise, are common? The cause may then be an external one. Two facts demand explanation. (1) It is only shepherds, agricultural labourers, and those coming into close contact with them, who have the disease. (2) The agricultural labourers of the Commune of Teste escape, while the workers in all the other Communes are attacked. Geographical conditions, water, diet, noxious plants and insects, etc., are in turn considered as possible etiological factors, but the author is not satisfied with any of these. The salient feature is that the Commune of Teste is the only one in which sheep are not present and the only one where no sheep manure is used in the fields. In the other Communes, moreover, the shepherds and agricultural labourers wear untanned sheepskins which are never washed. Further, the vine growers of Gujan do not use sheep manure for their plants and no cases of pellagra have occurred among them. Lastly there was found among the sheep a mortal disease, present only in the summer, characterized by severe diarrhoea with redness of the inner surface of the thighs. Is it not possible that in the handling and skinning of these affected sheep a contagious disease is contracted? HAMEAU convinced himself that pellagra was in some way associated with sheep and this conclusion is not so illogical when one considers for example, the position of a new investigator faced for the first time with the picture of blacktongue in dogs and of human pellagra in the same district.

A. D. Bigland.

GREEN-ARMYTAGE (V. B.). **Gynaecology and Tropical Diseases in Shakespeare.**—*Indian Med. Gaz.* 1930. June. Vol. 65. No. 6. pp. 333-339. [11 refs.]

In the universal theatre of Shakespeare, the physician, the surgeon, the apothecary, the nurse, and the midwife are all, of course, to be found, either playing their parts on the stage or swelling the orchestra of metaphor and simile. Everyone knows the punctilious doctor, setting down for professional remembrance the sinister ejaculations of Lady Macbeth's trance, but careful not to talk too much; and Falstaff's shabby soliloquy on honour's shortcomings in surgery; and Friar Laurence cutting his potent herbs in the magic of the grey-eyed morn; and the shop of the needy Mantuan apothecary; and the garrulous nurse revealing herself in the sly suggestions of her story of Juliet's weaning; and the midwife with her traditional aroma; and so on. Here Colonel Green-Armytage, having searched the Plays diligently, furnishes forth evidence of the poet's familiarity with the inside of our profession enough almost to convince the vociferous Baconian pedant that Shakespeare was Harvey or Sydenham, and not Bacon after all.

Since the paper is in the main a collection of quotations from the plays with fit accompaniment of commentary, we can but indicate its professional range and savour. It begins with early marriages, and with desirable disparity of age in wedlock—"Let still the woman take An elder than herself; so wears she to him, So sways she level in her husband's heart." The prolegomena and accidents of childbirth follow—quickenings, and the whimsical longings of pregnancy; antenatal influences that perpend disaster to the foetus, or blemish and deformity to the infant; premature birth, dystocia, and Caesarean section—Macduff and Posthumus, both "from the womb untimely ripped"; and then the (prophetic) "first cry" of the infant—"the first time that we smell the air We wawl and cry that we are come To this great stage of fools." Wormwood to the dug, as in Juliet's weaning; Love-philtres, and charms, etc., for sterility; and midwives and their affinity for aqua vitae come next, and are followed by quotations of medico-legal interest. Among diseases included in the author's quotations are ague, plague, dysentery, anaemia, consumption, hydrophobia, pyorrhoea, syphilis, enuresis, itch, and goitre. Under ague we are sorry not to find that significant figure "worse than the Sun in March this praise doth nourish agues," since it is one of those passages that reveal Shakespeare's intimate knowledge of the incidence of the disease. Finally there are quotations regarding the effects of diet and of alcohol, and on diagnosis by inspection of the urine, and some fine and familiar passages on the "mind diseased," and on prognosis—looking into the womb of time by the light of past history.

Colonel Green-Armytage does not claim to have treated his subject exhaustively, his chief purpose being to awaken a "fresh interest in the world's greatest poetic genius." His success is assured; and yet one could wish that he had taken capital notice of one of the strongest points in Shakespeare's conception of the healing art, namely his thorough understanding of the *curative* influence of Sleep—"Nature's soft nurse," "Sore labour's bath," "Balm of hurt minds." The exquisite passages in praise of Sleep, the healer, may be as familiar as church bells, but their melody can never die away, and here they would have harmonized to the full with the fine quotations chosen by the author to illustrate the poet's conception of maladies of the mind as infirmities to be treated with the "silken thread" of sympathy and suggestion, and not as stuff for the strait-waistcoat.

A. Alcock.

MISCELLANEOUS.

PESSÓA (Samuel B.). Nota sobre algumas substancias larvicidas. [**Some Larvicidal Substances.**]*—Folha Med.* 1930. Dec. 25. Vol. 11. No. 36. pp. 409-410.

The author puts on record the results of laboratory experiments with various advertised larvicides, employing Anophelines and Culicines at different stages; no field tests have been made.

1. *Caporit*, a Bayer product containing 95 per cent. of Ca hypochlorite, in a strength of 0.5 per cent., killed larvae in 3-4 hours, more rapidly still in 1 per cent. solutions. 2. *Fluoride of calcium and aluminium*, recommended by the Rützersmerke Co., was quite ineffective even in 3 per cent. solution. 3. *Cruzol*, a substance readily miscible with water [composition not stated], killed larvae in a few minutes in a strength of 1 in 8,000. It was also fatal to fish and is therefore indicated mainly for small domiciliary or local collections. 4. *Solarina*, a derivation of, but less effective than, kerosene, killing in 5 hours, whereas kerosene or Diesel oil takes only 2 hours. 5. *Dyes sensitized by light*, such as erythrosin or Congo Red, killed small larvae in fairly high dilution, 1:100,000—1:500,000, in 1-25 days, but was useless for larger larvae or for pupae, which developed normally in water so treated. The author believes that these photodynamic substances act largely by destroying bacteria and protozoa and thus depriving the larvae of their food supply. [This would hardly explain their having no effect on larger larvae.] 6. "*Salus*" proved almost useless in the author's hands.

H. H. S.

WALCH (E. W.) & BONNE-WEPSTER (J.). Vergelijkend onderzoek van enkele oliesoorten en mengsels hiervan als larvendoodende middelen. I. [**Oils and Oil Mixtures as Larvicides.**]*—Geneesk. Tijdschr. v. Nederl.-Indië.* 1929. Apr. 10. Vol. 69. No. 4. pp. 333-348. [English summary pp. 348-349.]

"The object of our experiments therefore was to try and find a larvacide suitable to the conditions in our archipelago and which would be less expensive than the solar oil now generally in use and at least equally effective.

"In the first place we recommend as such the so-called 'sludge,' a waste product of the residu-manufacturing of the Bataafsche Petroleum Maatschappij. Even in breeding-places with a great many algae 5 cc. of it per square meter is sufficient if the spreading is done quite evenly. As in practice this condition will not always be fulfilled, it will generally be wise to increase the amount of oil used to 7.5 or even 10 cc. per square meter. The price of sludge is f 4.50 per 300 L. (Delivered at Tandjong Priok).

"If it does not matter if the aquatic vegetation be destroyed even the still cheaper waste crank-case oil may be applied, of which, however, 40 cc. per square meter are needed. This larvacide will be especially useful in places where the sludge might be hard to get. By adding 10 per cent. kerosene and 1 & 2 per cent. castor- or coconut-oil (*Oleum cocos*) to the waste oil a mixture is obtained which gives already very good results when used in quantities of 20 cc. or even 10 cc. to the square meter, and which does not do so much harm to the vegetation. A mixture of 3 parts waste oil and one part solar oil also gives very good results if 20 cc. per square meter are used."

A. G. B.

PURDY (J. S.). **Petroleum in the Destruction of Insect Carriers of Disease.**
—*Public Health*. 1930. Sept. Vol. 43. No. 12. pp. 388-392.

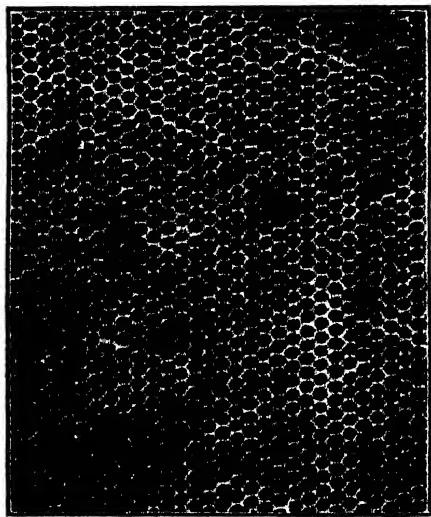
The author describes his experiences in the use of crude petroleum and kerosene for the control of mosquitoes, fleas and flies.

A. G. B.

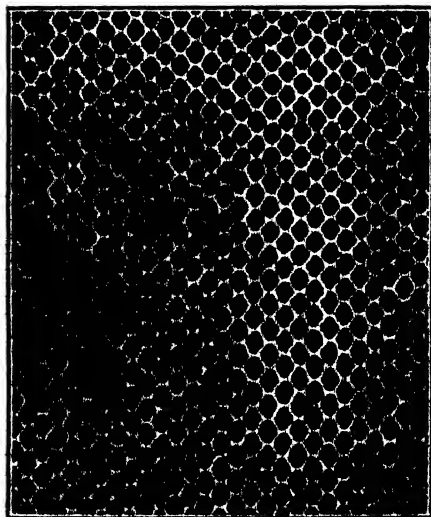
GATER (B. A. R.). **Mosquito Nets.**—*Malayan Med. Jl.* 1930. Mar. Vol. 5. No. 1. pp. 29-32. With 3 text figs.

The author writes:—

"A tour of shops in Kuala Lumpur revealed the fact that mosquito netting is usually sold as 'first' or 'second' quality with no specification as to the mesh or the cotton used. 'First' quality, such as that shown in fig. 2, is usually a smaller mesh, and it would appear that purchasers requiring the 'best quality' buy a net which causes more discomfort than would have been the case had the cheaper quality been taken. A third quality, for coolies, is also on sale. This can hardly be called mosquito netting and as may be imagined from the appearance of the sample illustrated in fig. 3 the discomfort of sleeping under it must be extreme. In fact in hospitals where this is used, it is quite usual for the patient to put his head outside the net to gain access to more air."



"First quality" netting in common use
—29/30 mesh 70/110 cotton. Finer than
necessary.



"Second quality" netting used for all
experiments with mosquitoes—22/23
mesh 60/100 cotton.

[Reproduced from the *Malayan Medical Journal*.]

There appears to be no information about the relation between the mesh of cotton mosquito netting and the percentage of daylight or air admitted. The question to decide in Malaya is the largest mesh which will exclude the vectors of malaria. At the Institute for Medical Research during 1929 over 50,000 mosquitoes passed through the experimental cages; in no instance did one escape through the netting, which was a 22/23 mesh of 60/100 cotton. Such a mesh is therefore efficient and nothing smaller need be used. As to the form of net, the author recommends that which is large enough to fall to

the ground some distance from the bed. This gives room for a table and reading lamp. Another recommendation is that since *A. maculatus* is still seeking blood in the early morning mosquito nets should not be removed from the bed until full daylight.

For the method of measuring the size of the apertures and the thickness of the thread reference is made to Colonel MACARTHUR's article in HOME's "Engineer and Prevention of Malaria."

A. G. B.

MISSIROLI (A.). La casa rurale nei riguardi igienici e sociali. [**Hygienic and Social Aspects of Rural Housing.**]—Supplement to *Riv. di Malariologia*. 1931. Vol. 10. No. 1. 59 pp. With 28 text figs. [22 refs.]

This supplement to the *Rivista di Malariologia* deals with rural and colonial housing in general—the choice of site, orientation of the building, construction, water supply, sewage and conservancy, cattle-stalls, etc.—questions with which architects and builders in the tropics are familiar. A small part only (pp. 12–17) is concerned with special features of such buildings when they have to be erected in a malarious district, attention being directed to the avoidance of re-entrant angles, or dark recesses in which mosquitoes can hide and find protection, to free ventilation, light and smooth walls, avoidance of curtains and hangings, raising of the ground floor off the soil level, and finally mosquito-proofing. The relative advantages of Monel (nickel 68 per cent. with copper and a trace of iron) in non-rusting and durability over the usual materials are stated. Stress is laid on the provision for automatic closing of mosquito-proofed doors and the need to ensure that they open outwards [a point not always remembered even by those who should and really do know better]. The whole is a clearly written brochure on rural housing applicable to tropical conditions.

H. H. S.

i. SCHANDER (R.) & GÖTZE (G.). Ueber Ratten und Rattenbekämpfung (mit besonderer Berücksichtigung der Wanderratte *Mus decumanus* Pall.). [**Rats and Measures to combat them.**]—*Zent. f. Bakt.* II. Abt. 1930. July 29. Vol. 81. No. 8/14. pp. 260–284. With 3 text figs. [Numerous refs.]

ii. — & —. Ueber Ratten und Rattenbekämpfung (mit besonderer Berücksichtigung der Wanderratte *Mus decumanus* Pall.). —*Ibid.* Sept. 4. No. 15/22. pp. 335–367. With 1 text fig. [1 page of refs.] [Prussian Agric. Experm. & Research Inst., Landsberg.]

i. This article gives a detailed description of the destructive character of the rat and of its menace as a transmitter of disease to human beings. It deals almost entirely with the sewer rat *Mus decumanus*.

ii. The authors deal here with baits and the rat poisons incorporated in them. Numerous experiments were made with a whole series of match boxes in cages, each containing a different bait, to

determine quantitatively which were the most acceptable to rats by the amount consumed in a given time. Among the grains tested were rye, wheat, barley and oats. Decided preferences were not manifested. An experiment was set up to see whether a preliminary 10 days feeding with a specific food would bring out a preference for that particular food; this was found to be the case with corn, cooked potatoes and horse flesh as the three test substances. Corn, bread and potato proved to be better baits than red herring, flesh and cheese, whilst bacon, syrup and cabbage stalk were not at all satisfactory. Fish may be useful in certain localities but not on the large scale. The addition of milk or butter milk to white bread improves its attractiveness. A table is given of relative values of baits with simple bread at 100; in this table the values of bread with anise, bread with milk, oatmeal, corn, oats, maize, linseed meal, uncooked potato, apple, tallow, raw meat, fresh fish, and sugar are, 30, 60, 80, 50, 50, 20, 10, 10, 0, 70, 0, 10 and 0 respectively. The best and most practical bait for large scale operations is fresh, well baked, white bread. The poison attack can only succeed if it is introduced suddenly and unexpectedly on top of a preliminary simple baiting. It is natural to suppose that the addition to baits of a substance with an odour might be a special attraction to rats just as valerian is for cats, but this was not found to be the case. Poisoned baits may be lightly wrapped in paper to prevent scattering and should be touched by hand as little as possible. All uneaten poisoned baits must be carefully gathered up on the day after use as otherwise subsequent attempts at poison attack may be foiled.

A considerable number of poisons have been specifically tested or criticized. Among these are bulbs of sea leek (*Scilla maritima*), barium bread or meal containing 20 to 25 per cent. barium carbonate, arsenic, thallium sulphate, fluorides, phosphorus, strychnine, trimonomethylxanthin, zinc phosphide, plaster of paris, etc. Some of these are too dangerous to use and others are unsatisfactory for various reasons. Those which are favoured are sea leek, barium, phosphorus and certain commercial preparations.

These articles, containing a wealth of detail, which cannot all be extracted, should prove invaluable to organizers of "rat weeks" and to those who employ rat trapping and rat poisoning as antiplague measures. References are given to the very abundant literature on the subject.

W. F. Harvey.

HEINEMANN (H.). Der derzeitige Stand unseres Wissens ueber die klinische Bedeutung der serologischen Blutuntersuchung, insbesondere im tropischen Lande. [**The Clinical Importance of Syphilitic Serum Testing in the Tropics.**]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1931. Jan. Vol. 35. No. 1. pp. 11-26. [Refs. in footnotes.]

At the second conference in Copenhagen on serological tests for syphilis an estimate was arrived at of the relative values of the Wassermann and flocculation reactions and the conclusion reached that the best of these latter are on an equality with the former. The author, who would go further than this and maintain that some flocculation

reactions are superior to the Wassermann test, has himself used the 3rd modification of the Meinicke test and Müller's test along with the Wassermann. His experience during the last 10 years has extended to nearly 40,000 sera and his conclusions are that (1) at least one of the flocculation reactions should always be combined with the Wassermann; (2) where patients are intelligent enough to give a good case history, serum tests are quite as valuable in eastern lands as in Europe. Malaria and leprosy are sources of error; (3) special care is to be exercised in the deductions made from tests where the patient is uneducated and unable to give a good case history—(a) When he belongs to a race in which yaws is not common, the serum test, especially if repeated in order to exclude non-specific temporarily positive reactions, is valid without an exact case history. (b) When he belongs to a race in which yaws is endemic then these reactions must be most carefully scrutinized in the light of the clinical manifestations if they are to be diagnostic of syphilis.

W. F. Harvey.

OONVALA (J. H.). **A Note on the Microscopical Examination of Faeces.**—*Indian Med. Gaz.* 1930. Oct. Vol. 65. No. 10. pp. 551–552.

The concentration method of YORKE and ADAMS was found superior to other methods both for protozoal cysts and helminthic ova. In this method a fairly large sample of faeces is suspended in a large quantity of water and allowed to stand for 15 minutes when the surface scum is removed. The liquid portion is then transferred to another glass cylinder and kept for 24 hours. At the end of this time the deposit is centrifuged, washed two or three times and then examined. This method, besides being efficient as a means of concentration also facilitated examination by the removal of unwanted débris.

W. F. Harvey.

BURKE-GAFFNEY (H. J. O'D.). **The Polynuclear Count of Cooke in Tropical Practice. A Preliminary Note.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1931. Mar. 13. Vol. 24. No. 5. pp. 549–556. [9 refs.]

In the Cooke modification of the Arneth count the average number of nuclear lobes per cell counted is the constant which is used in comparison. No portion of a nucleus is counted as a lobe except when its connexion with the nuclear body or the other lobes is reduced to a fine filament only. COOKE gives the figures for a healthy person as 10, 25, 47, 16 and 2 in the classes I, II, III, IV and V, which series furnishes an average weighted mean of 2.75. The author has, with some difficulty, obtained 37 cases of normal persons and his average of lobes per nucleus is 2.65. His present studies are merely preliminary but show a high degree of sensitiveness of the polynuclear count in bacterial infections, considerable sensitiveness in protozoal and helminthic infections and a usefulness as indicator of clinical progress. It is desirable to combine the polynuclear and differential counts.

W. F. Harvey.

- i. SMITH (E. C.). **Cultivation of the Spirochaetes associated with Tropical Ulcer.**—*Proc. Roy. Soc. Med.* 1930. Dec. Vol. 24. No. 2. pp. 217–220 (Sect. Trop. Dis. & Parasit. pp. 1–4). [10 refs.] [Med. Research Inst., Lagos, Nigeria.]
- ii. ——. **A Note on the Bacteriology of Tropical Ulcer.**—*West African Med. J.* Lagos. 1931. Jan. Vol. 4. No. 3. pp. 68–69. [6 refs.]

i. The medium used was prepared as follows :—

(1) Mix together normal salt solution 320 cc. and 2 per cent. nutrient agar 40 gm. (2) Sterilize 10 mins. at 120° C. (3) Allow to cool to 37° C. and add 15 cc. fresh human blood, or failing human, rabbit blood. (4) Shake to mix. (5) Distribute by sterile syphon into culture tubes. (6) Incubate to test sterility.

It was found that the medium was most suitable for culture when the blood formed a delicate coagulum throughout it instead of retracting and expressing serum. Inoculation was carried out by first cleansing the surface of the ulcer with swabs soaked in sterile water and then applying light constriction with a tourniquet above the ulcer. A clear serous fluid exuded from the surface of the ulcer and this was introduced in amounts of 0.5 to 1 cc. into the upper half of the column of medium. Incubation was aerobic at 37° C. and cultures were examined after 3 days by dark field for living spirochaetes. Subcultures, to the number of 32, at intervals of 4 to 10 days have been successful but it has not been possible to obtain pure cultures of the spirochaete.

Inoculation trials were made on volunteers, some of whom had, or were convalescent from, tropical ulcer. The controls in these cases consisted of inoculations of the other arm with the organisms, fusiform bacilli and pseudomonas, associated with the spirochaete. The mixed nature of the culture was a complication in the experimentation, but it was found that (1) the spirochaetes in this mixed culture could produce a lesion resembling tropical ulcer, (2) the fusiform bacilli in a mixed culture and free from spirochaetes could produce similar lesions, and (3) pseudomonas in pure culture had no pathogenic effect.

ii. A mixed flora has been cultivated from typical "tropical ulcers" and the most noteworthy of these organisms are spirochaetes, fusiform bacilli and elongated motile Gram-negative bacilli simulating spirochaetes. Pure cultures have not been obtained nor has mutation of the fusiform bacilli to spirochaetal forms been observed.

W. F. Harvey.

CROZAT (P.) & ASSALI (J.). **Traitement de l'ulcère phagédénique par le lipo-vaccin antiphagédénique.** [**Treatment of Phagedenic Ulcer by Lipovaccine.**]—*Bull. Soc. Path. Exot.* 1930. Nov. 12. Vol. 23. No. 9. p. 995.

The lipo-vaccine contained in each 2 cc.—*Spirillum necrosans* 5 mgm., *Bacillus fusiformis* 5 mgm., Streptococci 30 million, Staphylococci 30 million, *Ps. pyocyanea* 30 million, and was given subcutaneously on successive days in doses of $\frac{1}{4}$, $\frac{1}{2}$ and 1 cc., with repetition of the last dose if required. No injurious effect was observed as a result of injection and the phagedenic effect was arrested by the 4th day, when fusiform bacilli began to disappear. By the 10th day these bacilli should have disappeared altogether.

W. F. Harvey.

SCHOTTE (André). L'ulcère phagédénique. Essais de traitement chirurgical. [**Phagedaenic Ulcer. Surgical Treatment.**].—*Bruxelles-Méd.* 1931. May 3. Vol. 11. No. 27. pp. 778-786. [31 refs.]

An article on all the aspects of tropical ulcer. The surgical treatment consists in curettage, free excision of the edges and subsequent application of Tiersch grafts.

A. G. B.

RHO (Filippo). Sull' opportunità di provare gli estratti testicolari nella cura topica delle suariate forme di piaghe ed ulceri tropicali. [**Treatment of Various Forms of Ulcer by Local Application of Testicular Extract.**].—*Ann. di Med. Nav. e Colon.* 1931. Jan.-Feb. Year 37. Vol. 1. No. 1-2. pp. 1-7. [32 refs.]

An account of the revival of an old method of applying "the energetic cicatrizing action" of testicular hormone" reported ten years ago by AIEVOLI (*Riforma Medica*, 1921, No. 40). Fresh testes in thin slices from a guineapig are applied to the wound or an extract may be used [see *ante*, p. 57].

H. H. S.

BRENNAN (C. H.). **A Note on the Treatment of Ulcers.**—*Kenya & East African Med. Jl.* 1930. Oct. Vol. 7. No. 7. p. 203.

"By means of a large curved bistoury the whole of the infected tissue is removed completely. It should be noted that the ulcer is excised and not scraped.

"The resulting wound should be dressed with eusol, and eusol dressings should be continued twice daily for some days until the surface is clean.

"Afterwards a dressing of B.I.P.P. should be applied once daily for some days until it is certain that there is a clean granulating surface.

"The site can now be treated by skin grafting."

The author has found this method very satisfactory.

A. G. B.

FORBES-BROWN (A.). **A Report on Ulcers.**—*Uganda Protectorate Ann. Med. & San. Rep. for Year ended 31st December, 1929.* Appendix VII. pp. 105-108.

This is a preliminary report since only 59 cases have been studied but the results are of interest. The author concludes that the ulcers seen in Uganda have nothing in common with veldt sore; that the fusiform bacillus and spirochaete is found in nearly every case of phagedenic ulcer; that the cause of chronicity is the absence of skinning, granulation being good; that skinning starts as soon as parathyroid is administered. The year 1930 was to be devoted to a thorough trial of parathyroid.

A. G. B.

COUVY & POPOFF. Note sur le traitement de la pneumonie par le salicylate de soude en injections intraveineuses (deuxième note). [**Treatment of Pneumonia by Intravenous Salicylate of Soda.**].—*Bull. Acad. Méd.* 1931. Feb. 3. Year 95. 3rd Ser. Vol. 105. No. 5. pp. 163-167. [4 refs.]

The authors refer to their first paper and to that of MOELLER (*ante* p. 763) on salicylate treatment of pneumonia. They themselves have

treated 140 patients at Dakar over a period of two years, with 7 deaths, a fatality rate of 5 per cent. The cases are classed as very grave, grave and cases of average severity; 54 were in the first category which furnished 6 of the deaths. The salicylate is in 1:30 solution, and 30 cc. are injected, either once daily or morning and evening. There were no untoward symptoms. The largest quantity given was 11 gm. in 6 days. The authors hope that other practitioners in Africa will try this treatment, with controls.

A. G. B.

WILKINSON (W.). [Treatment of Pneumonia.] [Correspondence.]—*Kenya & East African Med. Jl.* 1931. Apr. Vol. 8. No. 1. p. 33.

The author, writing from the Native Hospital, Kisii, asks his colleagues to test this treatment in pneumonia:

Calcium chloride	...	...	...	...	4 grains
Sod. salicyl.	...	...	...	...	16 grains
Dist. water	...	...	...	...	15 cc.

given intravenously twice daily during pyrexia and once daily for the following week: 30 grains quinine also is given during the fever. In the few cases tried this has proved "most satisfactory."

A. G. B.

MANIFOLD (J. A.). **A Study of Certain Features in Connection with Enteric Group Infections in the Army in India.**—*Jl. Roy. Army Med. Corps.* 1930. June, July & Aug. 61 pp. With 12 text figs. [30 refs.]

The subject with which this study deals is one of great importance to the army in India. An analysis is made of 522 cases of enteric infection in which the standardized agglutination technique of DREYER was consistently used. All these individuals had been inoculated with T.A.B. vaccine and it is to the question of the effect of this previous inoculation upon the diagnostic value of agglutination tests that the author partly addresses himself. A definite diagnosis of the specific type of enteric infection could not always be arrived at by agglutination test. The proportion varied from 75 per cent. positive in severe cases to 35.5 per cent. in the mildest cases. There is no doubt that inoculation agglutinins show definite rise, whatever the particular infecting typhoid organism may be, but it is improbable that this is merely a non-specific rise for it occurs in so much higher a percentage of cases of enteric infection than of non-enteric pyrexia. Although specificity of diagnosis cannot always be attained by agglutination test, one of "enteric group" infection is possible in the great majority of cases of average severity.

There would seem a possibility that the dose of vaccine recommended for reinoculation is too high and reference is made to the possibility of attaining good results by a small fractional dose. An analysis of the inoculation agglutinins of 427 cases showed that these were highest for the paratyphoid B component and lowest for the paratyphoid A. An important finding is that blood cultures, taken at the proper period

of illness and incubated for at least 10 days before being reported negative, afford as good results diagnostically in inoculated as in uninoculated cases. Numerous examples illustrate the points raised and an analysis of agglutination tests of 152 bacteriologically proven cases is given as an appendix.

W. F. Harvey.

ORPEN (L. J. John). **Some Uncommon Causes of Enteric and Dysentery.** (Preliminary Note.)—*Jl. Med. Assoc. South Africa*. 1930. Sept. 27. Vol. 4. No. 18. pp. 549-550.

The author gives some details of (1) organisms commonly recognized as causes of enteric and of dysentery, (2) organisms stated to be causes of these diseases and (3) certain organisms isolated by himself from cases of enteric-like and dysentery-like disease. A complete identification of these last has, in most cases, still to be made. It would appear probable that a number of saccharose and even lactose fermenters may have to be included as causes of enteric and dysentery.

W. F. Harvey.

HARIDAS (G.). **Cirrhosis of the Liver.**—*Malayan Med. Jl.* 1930. Sept. Vol. 5. No. 3. pp. 90-96. [1 ref.]

This article is of interest from the morbid anatomy aspect, not the clinical or aetiological, since the information in respect of the two latter is very meagre. The facts and figures presented are the results of study of the case-sheets and post mortem records of the Tan Tock Seng Hospital for the 15 months ending 31st March, 1930. In all there were 284 cases, and these are divided into two groups: 99 admitted for cirrhosis of the liver, and 185 "latent cases," implying those without symptoms referable to this condition and discovered at autopsy. In both the great preponderance is noticeable among the Chinese. Thus, of the group of 99, there were 97 Chinese, 1 Indian, and 1 Javanese, the numbers of these races admitted to the hospital during the period being respectively 15,107, 2,422 and 411 (the last figure includes Malays and Javanese). In the group of 185, there were 170 Chinese, 13 Indian and 2 Javanese. Among the first group portal cirrhosis with small liver was commonest, Hanot's hypertrophic form once, biliary cirrhosis (5), syphilitic (5), schistosomiasis associated in two instances [but it is stated in another part of the paper "*Schistosomum japonicum* and *Clonorchis sinensis* were found in several patients"] and 11 cases of carcinoma supervening on cirrhosis were found. Among the latent cases the following types were discovered: fine diffuse cirrhosis (93), malaria pigmentation associated (19), coarse diffuse cirrhosis (11), syphilitic (10), atrophic (10), multilobular (11), portal congestion with cirrhosis (12), *Clonorchis* infection (6). As already stated, information as to cause is lacking; the question of alcohol and opium indulgence was asked of 20 patients only, the W.R. was done in 28, "six out of 21 cases gave a definite history of malaria." [Presumably these matters were investigated in others but no record was entered on the case-sheets or the author would doubtless have mentioned the fact.]

H. H. S.

VINT (F. W.). **Cirrhosis of the Liver in the East African Native.**—*Kenya & East African Med. Jl.* 1931. Mar. Vol. 7. No. 12. pp. 349–374. With 1 plate. [51 refs.]

A careful paper on the pathological histology of cirrhosis of the liver based on a series of autopsies on East African natives together with a consideration of its aetiology. The material was obtained from 100 consecutive post mortem examinations. It is interesting to note that the relative weight of the liver in normal African natives is higher than in Europeans. In the latter 50–55 oz. is usually regarded as the normal in adults of an average weight of 162 lbs.; but the average adult native weighs about 128 lbs., his liver 55.9 oz. (average of 175 cases) or the same as the European instead of the proportional 40–45 oz.

Among the 100 examined 31 showed no excess of fibrous tissue, 4 showed syphilitic lesions, 2 advanced amyloid degeneration, and the remaining 63 varying degrees of cirrhosis. The author did not find one case of true polylobular cirrhosis; some macroscopically resembling this form were found microscopically to be the monolobular. An early stage appeared to be hyperplasia of the connective tissue of Glisson's capsule. Destruction of hepatic parenchyma cells was always most marked at the periphery of the lobule adjoining the portal venous radicle. A round-cell infiltration was also a constant finding and from its character and distribution the author concludes that it is the result of a mild chronic toxin carried in the portal circulation. Malarial pigment was found in 69 cases. Changes of weight of the liver were significant. In the early stages (8 cases) the weights varied between 40 and 60 oz., with an average of 50; in more advanced stages (6 cases) the limits were 44 and 70, with an average of 52.5 oz.; in the well-developed stages (4 cases), between 61 and 71 with average 64.7 oz. In the very advanced, contraction took place with reduction in weight; in four such the weights varied between 22 and 41, with an average of 32.5 oz. Fatty degeneration was present in a certain number, but Dr. Vint could not detect any aetiological relationship between it and the cirrhosis.

Helminthic infestation was found in most; thus of the 63 there were 58 with *T. saginata*, 50 with *A. duodenale*, 35 with *Ascaris lumbricoides*, and the invasion was often heavy.

In discussing the cause of the fibrosis, the author concludes from the distribution of this tissue and of the round-cell infiltration that the portal venules are the channels of conveyance of the possible toxin. This toxin may arise from one of three sources: the worms present in the intestine, haemolytic poisons acting in the liver, or resulting from haemolysis produced by them, or, thirdly, toxic products of foodstuffs. Evidence incriminating the first is insufficient alone but on clinical grounds he concludes that the helminthic toxins are probably of a minor degree of toxicity. The distribution of lesions does not lend support to the idea that malaria is the cause, though it may have been operative in 14 patients where the infiltration was present both of the central vein and the portal canal. The question of the effect of diet is inadequately considered as the food value of the native diet belongs more to the realm of biochemistry; but so far as this aspect is discussed the diet is thought not to produce the cirrhosis as the indol and skatol resulting from metabolism of the East African native are insufficient in quantity. The author concludes that "while it is impossible to state definitely the origin of the substance causing the proliferation of the fibrous tissue of the portal canal, the evidence is

such that one must consider toxic substances produced by intestinal helminths as a causative factor." [The diet may play a larger part than Dr. Vint is inclined to ascribe to it. The East African native (the Masai excluded) lives largely on a vegetarian diet, and such causes more ammonia formation than does a meat diet. The consequent specific hepatogenic urea formation, by making excessive demands on the function of the liver, has been suggested as accounting for hepatic insufficiency and subsequent cirrhosis in native races.]

H. H. S.

NAZARETH (F. X. de Siqueira). Dobó ou Dobá. [**Dobo.**—*Arquivos da Escola Méd.-Cirurg. de Nova Goa*. Ser. B. 1930. No. 3. pp. 477-509.]

Dobó, a corruption of Dobá, is the name given by the Hindus of Goa to a disease affecting almost, if not absolutely, exclusively Hindu children. The word dobá means a "little round box" and the disease is said to be so called because the enlarged liver has the size and shape and in consistence imparts to the examining hand the sensation of a box. Nearly all those attacked are 2 years old or less, of the better class of Hindu, mostly Brahmans; the sexes are equally involved, and non-vegetarians as well as vegetarians.

The main symptoms are fever, usually up to 100° F., but occasionally going to 102° or even 104° F., loss of appetite, insomnia, general debility, pallor and wasting, with swelling of the abdomen from enlargement of the liver which may extend to the level of the umbilicus. There is not as a rule any pain till the later stages. There is a subicteric tint of skin and conjunctivae, diarrhoea with pale faeces, urine diminished in amount and bile-stained; the spleen enlarges later and ascites appears. In some cases haemorrhages occur, haematemesis, epistaxis, haematuria, and perhaps convulsions and death takes place in coma (? cholaemic) after 3 to 18 months' illness. Brief notes are given of 14 cases, and the question of diagnosis is discussed, as to whether the condition may be infantile biliary cirrhosis, infantile kala azar, of dietetic (avitaminic) origin, malarial or syphilitic, or other toxic state. Pathologically, the liver shows a cirrhosis of the monolobular type and later pericellular, very like Hanot's cirrhosis.

Mention is made of the work of Dr. S. K. MUKHERJI (reference not given) and to that of Dr. Viadyanath IYER (*Indian Medical Gazette*, 1926, Dec.) on the subject. No treatment has so far been found of any avail.

H. H. S.

CORKE (Winifred H.) & BUSH (Lilian M.). **An Investigation of Some Cases of Anaemia in Tamil Women.**—*Malayan Med. Jl.* 1930. Dec. Vol. 5. No. 4. pp. 129-135.

The authors at the Women's Hospital, Kulah Pilah, studied 31 cases of anaemia, 26 of which were in pregnant Tamil women, and 5 in non-pregnant. The cases fell roughly into three groups—

"A. Pernicious type of anaemia, with a colour index over 1 and abnormal red cells (normoblasts and megaloblasts). In most of these cases the red cell count ranged between 750,000 and 1,500,000, and the white cell count was moderately low with a relative lymphocytosis. A few

myelocytes were nearly always present. There were 22 cases of this type with 7 deaths, usually following premature labour.

"B. Aplastic type with a very severe degree of anaemia, a high colour index, and no abnormal cells. There were 3 cases with 3 deaths.

"C. Secondary type with a lower colour index and no abnormal cells. There were 6 cases with no deaths."

Tabulated details are given of selected cases and tables of each group with the headings, Wassermann reaction, malarial parasites, helminthic ova, progress, treatment, etc. The authors were struck by the high percentage of cases (39) with positive Wassermann without clinical manifestation of syphilis [but do not give any control figures]. They agree with PINEY who believes that syphilis is commoner in sufferers from pernicious anaemia than in the general population. Some patients improved with antisyphilitic treatment; others did not. Malaria and ankylostomiasis played but a small part in this series. They conclude that the pernicious anaemia of Indian women is not caused by pregnancy but is aggravated thereby. "It seems to originate in a combination of a blood-destroying infection, such as malaria or syphilis, and an insufficiency of vitamins in the diet." [No dietetic details are given.]* A. G. B.

MEYERS (F. M.). Over Bloedarmoede bij Contractarbeiders. [**Anaemia in Contract Labourers.**].—*Geneesk. Tijdschr. v. Nederl.-Indië*. 1930. Dec. 1. Vol. 70. No. 12. pp. 1196-1212. [9 refs.] [Central Hosp., Membang Moeda, E.C. Sumatra.]

Two hundred consecutive cases of anaemia (under 55 per cent. Hb. Sahli) were studied by the author. Among his native (Javanese) labourers anaemia was four times as frequent in women as in men. Yet the more serious degrees were more frequently seen in men. Simple hospitalization without any particular treatment cured the condition without exception in a comparatively short time. In pregnant women recovery took longest. Treatment with ferrum redactum, 1-4 gm. per day, had no apparent influence on the duration. [In the discussion the contrary opinion was emphasized.]

As regards etiology a certain part is played by malaria (splenic enlargement), more in men than in women. Yet this influence is not very important and the author could practically exclude from his records the other notorious cause of tropical anaemia, hookworm disease. [In the discussion again stress was laid upon the exceptional position of the author's field of labour in this respect in comparison with other parts of the East Coast of Sumatra.]

In the etiologically doubtful cases the author invariably found an increased percentage of reticulocytes as a sign of abundant regeneration of the blood, often also enlargement of the spleen as a sign of increased deterioration. As a partial explanation, he thinks that social circumstances have a certain influence. Better general care of the labourers is accompanied by less non-classified anaemia among them.

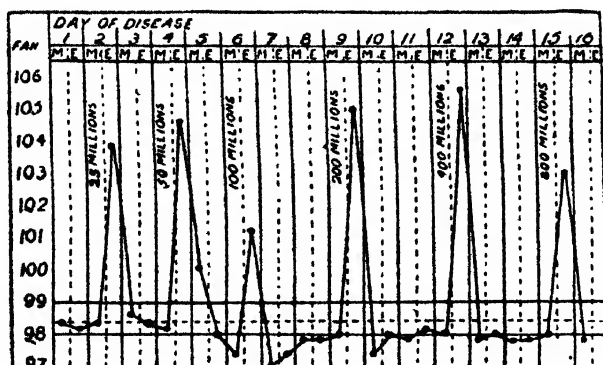
W. J. Bais.

MCGOLRICK (Leo). Non-specific Protein Therapy in Elephantiasis.—*Brit. Med. J.*. 1930. Dec. 6. p. 957. With 2 text figs.

A male Chinese was admitted to the Weihaiwei Hospital with solid oedema of the left leg below the knee, the affected limb being fully twice

* See also *Bulletin of Hygiene*, Vol. 5, p. 835 (WILLS & MENTA).

the size of the other. He gave a two years' history. He was put to bed, the limb firmly bandaged and T.A.B. vaccine given as in the chart.



Temperature reactions to intravenous injection of T.A.B. vaccine in increasing doses of 25, 50, 100, 200, 400 and 800 million organisms on second, fourth, sixth, ninth, twelfth and fifteenth days respectively in non-specific protein therapy in elephantiasis.

[Reproduced from the *British Medical Journal*.]

There was a steady diminution in size; the bandage had to be readjusted daily. On the 16th day he left. The author is convinced that elastic pressure alone could not have achieved this result. Whether the condition was filarial or of other origin is not discussed.

A. G. B.

MARONE & TESSITORE (C.). Un caso di voluminosissima elefantiasi scrotale. [**A Large Elephantoid Tumour of the Scrotum.**—*Arch. Ital. Sci. Med. Colon.* 1930. Sept. 1. Vol. 11. No. 9. pp. 513-516. With 2 text figs. English summary (3 lines).

A man of 35 years, a native of Jakata (Belgian Congo) with a scrotal tumour measuring 77 by 65 by 20 cm. and weighing 94.5 kgm. The patient was emaciated and though he seemed to improve for a time after the operation he died on the thirteenth day, "the cause being undetermined."

H. H. S.

LOPEZ & NUSSA (E.). Simpatsectomia peri-arterial en la elefantiasis. [**Peri-arterial Sympathectomy in Elephantiasis.**—*Bol. Asoc. Med. de Puerto Rico.* 1930. Mar. & Apr. Vol. 21. No. 176. p. 5.

A preliminary report on 3 cases in which the femoral artery of an elephantoid limb was decorticated by injection of boiled water from 3 months to 3 days earlier. In one case there was some reduction in the size of the limb.

Clayton Lane.

SCRIVER (Jessie Boyd) & WAUGH (T. R.). **Studies on a Case of Sickle-Cell Anaemia.**—*Canadian Med. Assoc. J.* 1930. Sept. Vol. 23. No. 3. pp. 375-380. With 4 figs. & 2 charts. [10 refs.] [Royal Victoria Hosp., & Path. Dept., McGill Univ., Montreal.]

This being the first reported case of sickle-cell anaemia from a Canadian clinic the authors wish to record the behaviour of the red

cells *quasi in vivo*. It is a fine study, and its vivid feature is that it supports and confirms the *in vitro* conclusions of HAHN and GILLESPIE (see this *Bulletin*, Vol. 25, p. 387) that the red cells of persons with the sickle-cell trait are transformed into sickles *in vitro* as a result of asphyxia, and that the sickleling phenomenon is reversible.

The patient is a negro girl of 7 years born in New York, and so far as the family history can be got it tells of a relative who had died with symptoms similar to hers—cough, night sweats, vague pains in legs and joints and occasionally in abdomen, poor appetite, and increasing fatigue. The physical signs were pallor of mucosae and of palm and sole, greenish-yellow sclerae, slightly enlarged heart and soft systolic murmur, no enlargement of liver or spleen, and no (palpable) adenopathy. The laboratory observations were slight urobilinuria, no intestinal parasites, negative Bordet-Wasserman test, positive reaction to 0.1 mgm. of old tuberculin intradermally, and an X-ray picture of enlarged glands at hilus of lung. The blood examination showed, *inter alia*, red corpuscles 2,600,000, haemoglobin 45 per cent., about 10 per cent. of red corpuscles sickle or oat or some similar shape, a few nucleated red cells, and (in preparations stained by brilliant cresyl blue) reticulation in about 50 per cent. of the red corpuscles; leucocytes 12,000, eosinophiles 4.8 per cent., mast-cells 1.0 per cent. Resistance to haemolysis was moderately increased and the presence of bilirubin was very evident.

If sealed preparations of wet blood were examined at once the percentage of sickles was about 10, but when they were examined twenty-four hours afterwards the percentage of sickles became more than 80.0. If, however, dried smears were made from the wet preparations by removing the cover-glass it was found that by exposure to the air most of the sickles had returned to the normal circular form and that only about 10.0 per cent. of the cells in the dried smear were still sickles—the reversion of the great majority to the normal form had been "practically instantaneous." Subsequently, by producing local stasis in different ways and then making (with as little as possible exposure to the air) both wet preparations and dry smears from the asphyxiated area it was found that while the dry smear showed no appreciable increase in the percentage of sickle-cells, practically all the red corpuscles in the wet preparation showed some irregularity and 28 per cent. were "markedly distorted." The following interesting table may be extracted:—

	CO ₂ content, Vols. per cent.	O ₂ content, Vols. per cent.	Percentage of O ₂ saturation.	Percentage of sickle- cells.
Blood taken with- out stasis ...	50.3	3.2	33	15-20
Blood taken with stasis ...	49.5	2.2	23	95
Blood taken after local immer- sion in hot water and fric- tion to promote maximum oxy- genation ...	44.9	6.0	62.5	5

From their observations the authors argue that the massing of sickle-cells in sinuses and organs at autopsy and in other circumstances "may be purely an agonal phenomenon when O₂ pressure must in the

process of death be lowered well below the critical point"; and from the facts of sickleling in the blood-stream and of reversibility of the sickleling reaction, they agree with some other observers that sickle-cell anaemia is not a disease of the spleen or the bone-marrow but is a congenital peculiarity within the negro race.

A. Alcock.

BRANDAU (G. M.). **Incidence of the Sickle-Cell Trait in Industrial Workers.**—*Amer. Jl. Med. Sci.* 1930. Dec. Vol. 180. No. 6. pp. 813-817. With 1 plate. [13 refs.]

The following are the author's own conclusions :—

" 1. The history, however important in other respects, is of little value in the detection of subjects with sickle-cell trait, but may be suggestive.

" 2. The physical signs are not diagnostic. Absence of scleral color anomalies or of lymph-node enlargement may possibly be regarded as evidence against the presence of the sickle-cell trait in any one individual.

" 3. Examination of moist blood films is a simple method of diagnosing the condition.

" 4. The percentage of the occurrence of the sickle-cell trait in 150 negro men applying for work was 6.67 per cent."

A. Alcock.

LAVIER (G.). Sur cinq cas dont trois mortels d'intoxication aiguë par la quinine. [**Five Cases, Three Fatal, of Acute Quinine Poisoning.**]—*Bull. Soc. Path. Exot.* 1931. Mar. 11. Vol. 24. No. 3. pp. 184-187. [4 refs.]

In October 1918, at Salonica, owing to a general offensive there was a large increase of malarial cases, and stock solutions were made up, one containing sulphate of soda 120 gm. to the litre, another quinine hydrochloride 65 gm. to the litre, which gave 1 gm. to a tablespoon. An infirmier took the quinine bottle in mistake for the sulphate of soda and gave five patients a full " quart " (16 gm. quinine) swallowed at a gulp. Three died after 5, 10 and 20 minutes respectively with clonic followed by tonic convulsions. The other two vomited several times, evacuating part of the poison. After clonic muscular contractions they went into coma, emerging some 40 hours later, after which they slowly recovered. One had quinine amblyopia which gradually improved but had by no means disappeared a month later when he left for France. The other, admitted for " quinine-resistance," showed no trace of infection during the month he was under observation and Lavier thinks he was cured. These two probably absorbed 10 gm. each. The autopsy findings on the three fatal cases are given. The author notes that the first sign of poisoning, affection of the bulb, appeared in two minutes.

A. G. B.

BINET (Léon) & FABRE (René). Quinine et sang splénique. [**Quinine and Splenic Blood.**]—*C.R. Soc. Biol.* 1931. Apr. 24. Vol. 106. No. 12. pp. 1116-1118. With 1 text fig. [2 refs.]

The authors have previously found that in dogs injected with quinine urethane, after 48 hours the quinine can be found in the blood cells but not in the plasma. They have now compared in 3 dogs the quinine content in the circulating arterial and venous splenic blood (method of Stass-Otto,

modified by Ogier; alkaloidal residue examined for fluorescence). They find that with the subject at rest the venous splenic blood contains twice as much quinine as the arterial, which they explain by the observation that the splenic blood is twice as rich in cells.

A. G. B.

SADLER (Eileen S.), DILLING (Walter J.) & GEMMELL (Arthur A.). **Further Investigations into the Death of the Child following the Induction of Labour by Means of Quinine.**—*Jl. Obstet. & Gynaecol. Brit. Empire*. 1930. Vol. 37. No. 3. pp. 529-546. With 4 text figs. [14 refs.] [Pharmacol. Dept., Univ., Liverpool.]

The following extracts from the conclusions of this paper are of general interest:—

"1. When three doses of quinine (grs. X) are given at hourly intervals the peak of urinary excretion and, therefore, probably the maximal concentration in the blood of the mother lies usually between the sixth and twelfth hour after the first dose: there is evidence that wider spacing of the dosage [for induction of labour] is not advantageous.

"2. Quinine is readily excreted into the placenta (1:66,000) and liquor amnii (1:10,000); it has been found in foetal tissues in strengths (1:50,000—1:100,000) which are capable of toxic effect and after intervals which suggest that maternal reabsorption from the foetus is slow and that foetal urinary excretion (1:6,000) is limited. Cumulation of quinine in foetal tissues can occur."

"6. Although there is experimental evidence to prove that quinine may cause intrauterine death of the child, statistics show that this risk is not greater than that of still-births from undiscovered causes in otherwise normal labours."

As test for quinine the herapathite test as modified by RAMSDEN & LIPKIN was used (*Ann. Trop. Med. & Parasit.*, 1918, Vol. 11, p. 443).

A. G. B.

EPSTEIN (David). **A Comparison of the Action of Plasmoquine and Quinine on the Uterus.**—*Jl. Med. Assoc. South Africa*. 1931. Jan. 10. Vol. 5. No. 1. pp. 15-16. [3 refs.] [Pharmacol. Dept., Univ., Cape Town.]

It is claimed that plasmoquine is without action on the uterus and can therefore replace quinine with advantage in the treatment of pregnant women suffering from malaria. The author investigated the matter on isolated uteri of cats and guineapigs and on the cat's uterus in the living body. It was shown that given in moderately large doses plasmoquine is able to produce uterine contraction in these animals. FRANK's statement [this *Bulletin*, Vol. 27, p. 658] that plasmoquine prevents the stimulating effect of quinine on the uterus could not be confirmed.

"In therapeutic doses, however, it appears that plasmoquine has no effect on the uterus, and this latter observation tends to confirm the clinical results. It thus follows, both from clinical tests and experimental work performed on animals, that plasmoquine can be considered as a safer drug to employ than quinine when treating pregnant women suffering from malaria, as long as therapeutic doses only are administered."

It is noted that, when equivalent doses are employed, the actions of quinine in the cat and in man are very similar.

A. G. B.

SLOT (J. A.). Thrombopenie als verschijnsel van Chinineidiosyncrasie. [**Thrombopenia as a Symptom of Idiosyncrasy to Quinine.**—*Geneesk. Tijdschr. v. Nederl.-Indië*. 1931. Jan. 1. Vol. 71. No. 1. pp. 46-48. With 1 text fig. & 1 plate.

Hypersensitivity to quinine may be manifested by nervous symptoms, by disturbance of the circulation, by haemorrhagic symptoms or by skin reactions. The author describes two patients suffering from the haemorrhagic type, one of whom (a Chinese) was studied in detail. After a single dose of 1 gm. quinine he showed bleeding of the gums, under the mucous membrane of the tongue and under the skin, blood in the urine, later also intestinal haemorrhage. The number of blood platelets was 16,000 (Fonio's method). The patient recovered and the number of blood platelets rose again during the recovery. A second dose of quinine (apparently administered with experimental purpose) produced a relapse of the haemorrhagic symptoms. The acute thrombopenia is to be considered as the cause of the bleeding. It is not clear whether this is brought on by increased deterioration of thrombocytes by the spleen or by inhibition of their production.

W. J. Bais.

OKONOGI (Tatsuhiko). Experimentelle Untersuchungen ueber die Schädigung des inneren Ohres durch Chininarten. II. Mitteilung. [**Damage to the Internal Ear by Quinine.**—*Japanese Jl. Med. Sci.* IV. *Pharmacol.* 1930. Dec. Vol. 5. No. 1. pp. 82*-83*. [Pharmacol. Inst., Imperial Univ., Tokyo.]

This is the second communication by the author. He used healthy young rats and guineapigs for the experiments. The quinine alkaloids and their derivatives were injected subcutaneously and after development of toxic effects the animals were killed by vital fixation with formol-Müller solution and preparations of the internal ear were made in the usual way and studied. From his investigations the author concludes that quinidine is the most active in producing changes in the inner ears; vuzin and eucupin follow; hydrocuprein is the least active. Rats appear to be more resistant to quinine than guineapigs.

E. D. W. Greig.

GOODSON (John Augustus), HENRY (Thomas Anderson) & MACFIE (John William Scott). **The Action of the Cinchona and Certain Other Alkaloids in Bird Malaria.**—*Biochem. Jl.* 1930. Vol. 24. No. 4. pp. 874-890. [33 refs.] [Wellcome Chemical Research Labs., & School of Hyg. & Trop. Med., London.]

The authors have used Roehl's technique for testing the efficacy of drugs in bird malaria to compare the therapeutic values of the chief cinchona alkaloids and to investigate the efficacy of (a) a series of modified cinchona alkaloids and (b) a number of reputed, anti-malarial drugs.

There has been much discussion regarding the relative values of quinine, quinidine, cinchonine and cinchonidine and the four hydroalkaloids (hydroquinine, etc.) produced from them by reduction. The results of these trials in bird malaria indicate that among the first four there is little to choose. Reduction of quinine to hydroquinine enhances the activity, but reduction of the other three parent alkaloids has no effect. The five bases mentioned are arranged in the following descending order of activity:—hydroquinine, quinidine, quinine, cinchonidine, cinchonine, hydroquinine being clearly indicated as more active than any of the other four.

On gentle oxidation quinine is converted into an acid, quitenine, which has been repeatedly tried in bird and human malaria and found inactive. On esterification of quitenine basic character and anti-malarial action are simultaneously restored, and in the homologous series of alkylquitenines tested, anti-malarial activity increases as the series is ascended until at butyl- and amyl- quitenines, cures begin to occur. The maximum activity appears to be reached about this point, octyl-quitenine being inactive.

The reputed anti-malarial drugs tested included the alkaloids of the following drugs, all of which were inactive:—harmala, greenheart bark and akuamma seed (*Picralima Klaineana*, Pierre). The total alkaloids of four species of *Alstonia* barks were tried, viz., *A. congensis* and *A. scholaris*, both of which contain echitamine, and *A. macrophylla* and *A. constricta* which are rich in alkaloids but from which neither echitamine nor any other well-defined alkaloid has yet been isolated. *A. scholaris* and *A. constricta* were slightly active, the others not. A large number of well-known natural alkaloids, especially isoquinoline derivatives, were also tried and found inactive.

T. A. Henry.

RINEHART (James F.) & ANDERSON (Hamilton H.). **Effect of Emetine on Cardiac Muscle.**—*Arch. Pathology*. 1931. Apr. Vol. 11. No. 4. pp. 546-553. With 5 text figs. [12 refs.] [Med. School, Univ. of California, San Francisco.]

The authors summarize the literature of this subject as contained in 12 papers and express the opinion that the histological results of the action of emetine on cardiac muscle have not been reported in sufficient detail to command the attention they deserve. Their observations were made on rabbits. They write:—

"Lethal or sublethal doses of emetine hydrochloride in rabbits caused severe injury to the heart muscle. An interval of time was required for morphologic changes to become apparent. Animals dying in less than forty-eight hours showed evidence of heart failure in an interstitial edema of the heart muscle, indicated by spreading apart of individual fibres. In animals surviving lethal or sublethal doses for three or more days, necrosis of some fibres and a degenerative swelling in the remaining muscle fibres became evident. . . ."

A. G. B.

CHEN (Mei-Yu) & ANDERSON (H. H.). **Effect of Emetine Hydrochloride by Subcutaneous Injection on Oxygen Consumption in Human Subjects.**—*Proc. Soc. Experim. Biol. & Med.* 1930. Mar. Vol. 27. No. 6. pp. 521-523. [1 ref.] [Med. School, Univ. of California, & Pacific Inst. of Trop. Med., San Francisco.]

The authors state that no work appears in the literature on the effect of emetine on oxygen consumption. Their experiments were done on 5 medical students and 3 patients. They give a table of the maximum functional changes during one hour's observation following subcutaneous injection of emetine hydrochloride. They state:

"In 8 subjects on which 16 experiments were carried out a slight depression of oxygen consumption was noted following subcutaneous injections of therapeutic doses of emetine hydrochloride. Respiration was increased when affected. Changes in pulse rate were inconstant. A definite fall in

blood pressure was noted in 2 instances when 455 to 520 mgm. were given over a 10-day period."

A. G. B.

ANDERSON (Hamilton H.) & LEAKE (Chauncey D.). **Toxicity of Acetarsone (Stovarsol) and its Calcium and Sodium Salts on Oral Administration to Rabbits and Cats.**—*Proc. Soc. Experim. Biol. & Med.* 1930. Vol. 27. pp. 267-270. [9 refs.] [Med. School, Univ. of California, & Pacific Inst. of Trop. Med., San Francisco.]

Reports on the therapeutic efficiency and toxicity of this drug have been conflicting. The authors' findings are as follows:—

"The minimal lethal dose of commercially available acetarsone administered orally to cats and rabbits is between 125 and 175 mgm. per kg. This is about 4 times the toxicity originally reported by Levaditi for the material prepared by Fournau. In view of the relatively large number of clinical cases of acetarsone poisoning these experimental findings indicate the necessity of a revision of the recommended therapeutic dose.

"The minimal lethal dose of the calcium and sodium salts of acetarsone on oral administration to cats and rabbits seems to be about the same as that of acetarsone"

[Cases of stovarsol poisoning have been noted in this *Bulletin*, Vol. 24, p. 672; Vol. 25, p. 414; Vol. 26, p. 572.]

A. G. B.

CHEN (Mei-Yu), ANDERSON (H. H.) & LEAKE (C. D.). **Rate of Urinary Arsenic Excretion after giving Acetarsone ("Stovarsol") and "Carbarsone" by Mouth.**—*Proc. Soc. Experim. Biol. & Med.* 1930. Nov. Vol. 28. No. 2. pp. 145-148. With 1 text fig. [6 refs.] [Med. School, Univ. of California, San Francisco.]

"As part of the necessary pharmacological evaluation of a new drug before it should be tried even in controlled clinical experimentation, its rate of absorption (if given by mouth) and excretion should be studied. If possible this should be done on normal human volunteers in order that any deleterious effects may be noted to be guarded against when used in patients. Especially is this procedure important in order to judge the danger of cumulative effect before venturing to employ arsenical compounds on repeated administration in human therapy."

The authors note that, though it has considerable toxicity, there is no satisfactory information on this point in the literature of stovarsol. They have tried to supply the deficiency, including another drug in their study because it was found superior to stovarsol in the treatment of amoebiasis. They reached the following conclusions:—

"3-acetylamino-4-hydroxyphenylarsonic acid (acetarsone N.N.R. or 'stovarsol') and 4-carbaminophenylarsonic acid ('carbarsone') are rather slowly excreted in the urine after oral administration. In one normal human subject 20 per cent. of the ingested arsenic in 0.5 gm. acetarsone was recovered in the urine in 72 hours, but only 8 per cent. of the arsenic of the same dose of 'carbarsone' after 52 hours. In another normal human, 7 per cent. of the arsenic received in the same dose of acetarsone was found in the urine in 24 hours, while 13 per cent. was recovered from the same amount of 'carbarsone' in 42 hours. Even though relatively small absorption from the bowel is indicated by these

experiments, 'carbarsone' should be used cautiously in human therapy until it is established whether or not it is liable to injure the optic tract."

[Carbarsone is closely related to tryparsamide.]

A. G. B.

CORMAN. Intoxication par le stovarsol au cours d'un traitement d'enterite à trichomonas. [**Stovarsol Poisoning in Treatment of Trichomonas Enteritis.**]—*Bull. Méd. du Katanga*. 1930. Vol. 7. No. 5. p. 135.

After 5 days treatment with 0.75 gm. stovarsol in 3 daily doses the patient developed slight fever with jaundice and vomiting, followed by bleeding from gums and nose and a state of torpor; pulse infrequent; blood culture negative; death 2 days later. Post mortem, fatty degeneration of liver, congestion of kidneys and digestive tract with submucous haemorrhages.

A. G. B.

MARCHOUX (E.). L'orsanine dans le traitement des états intestinaux. [**Orsanine in the Treatment of Intestinal Conditions.**]—*Bull. Soc. Path. Exot.* 1930. Nov. 12. Vol. 23. No. 9. pp. 933-935.

Orsanine, which is suggested as a substitute for the sometimes poisonous stovarsol, when administered by mouth does not pass the intestinal mucosa; traces only can be found in the urine. Hence it is useless for parasites outside the gut. A single trial in each case showed it to be ineffective in amoebic dysentery and giardiasis. The author recommends it as a good intestinal disinfectant.

A. G. B.

DAVID (Norman A.) & LEAKE (Chauncey D.). **The Toxicity and Balantidicidal Action of "Di-Hydranol" in Guinea Pigs.**—*Proc. Soc. Experim. Biol. & Med.* 1930. Nov. Vol. 28. No. 2. pp. 196-199. [4 refs.] [Med. School, Univ. of California, San Francisco.]

The authors note that FAUST has recently reported on the clinical evaluation of this drug in man before the publication of an evaluation of the relation between the toxic and parasitidical dose in experimental animals [this *Bulletin*, Vol. 27, p. 886]. They followed the technique of SWEENEY (*loc. cit.* p. 291). They found that "dihydranol" caused death in guineapigs in about 4 days at an average dose of 400 mgm. per kg. on single oral administration and that in natural *Bal. coli* infestation it was curative at a total of 200-225 mgm. per kg. when given daily or on alternate days at 75 to 100 mgm. per kg. Toxicity may however be encountered on continued administration of these doses.

A. G. B.

VANNI (Vittorio). Contributo alla conoscenza della balantidiosi umana. [**Human Infection with Balantidium.**]—*Riforma Med.* 1931. Jan. 26. Vol. 47. No. 4. pp. 123-125. With 1 chart in text. [12 refs.] [Inst. of Med. Parasit., Univ., Rome.]

The interest of this case is largely due to the almost complete absence of intestinal symptoms and their replacement by toxic manifestations.

A woman of 50 years complained of general itching. A week later urticaria appeared, at first in localized patches, soon becoming general,

with temperature 39.5° C., tongue furred with bright edge, pulse 90. The abdomen was tender on deep pressure over the epigastrium and there was slight meteorism. The blood showed 8 per cent. eosinophilia and a faecal examination revealed many *Bal. coli* and *Chilomastix mesnili*, but no ova of helminths. She was restless, with vomiting and precordial pain. Treatment by rectal injections of chloral did not relieve the urticaria, nor did calcium and adrenalin; yatren had no effect on the parasites. Finally, enemata of thymol 1 gm. with alcohol 10 cc. and water 200 cc. were administered daily. The temperature fell to 37.2° C. on the sixth day, and the *Balantidia* were no longer found; two days later it rose again to 40.4° C. but was normal on the tenth day and the *Chilomastix* also disappeared; at a second blood examination eosinophiles were absent. The origin could not be determined; the patient had had no contact with monkeys or pigs. [There is nothing in the history pointing to the *Balantidial* infection being a condition of longer standing and this toxic state as due to causes other than the *Balantidium*.]

H. H. S.

HEUBNER (Dietrich Leonhard). *Lambliasis als Krankheit. (Beobachtungen an 173 Fällen.) [Lambliasis as Disease: 173 Cases.]—Ztschr. f. Klin. Med. 1930. Dec. 31. Vol. 115. Nos. 1 & 2. pp. 293-315. With 4 figs. on 2 plates. [42 refs.]*

Since the use of the duodenal tube has become general, the parasite described in 1859 by LAMBL has been frequently seen in the duodenal juice and we have here a record of 173 cases studied at Zwickau in the last five years.

	Admissions.	Diseases of Digestive System	Examined by Duodenal Tube.	Cases of Lambliasis.
1925	2,249	586	421	12
1926	2,980	750	614	31
1927	3,561	929	582	56
1928	4,169	1,005	531	37
Total ...	12,959	3,270	2,148	136
Percentage of Lamblia Cases	1.0	4.1	6.5	—

Details are given of 12 cases. The author concludes that *Giardia intestinalis* is a common parasite of man. As a rule it multiplies to such an extent that sooner or later it causes symptoms. Four per cent. of patients with symptoms of digestive disturbance are infected. The flagellates appear in the first juice delivered by the tube, especially after the use of "reflex remedies." They occur also in the stool, rarely in the gastric juice. They first colonize the duodenum and may beset the mucous membrane so closely as to lead to disturbance of function. They are often present in ulcer cases but seem to have no special relation to ulceration. They often wander into the bile passages where they may produce congestion. The symptoms produced are not characteristic, but it is best to eliminate the parasites, for which purpose neosalvarsan and spirocid are best.

A. G. B.

SORGE (Giuseppe). La cura della lambliasi intestinale con la naftalina. [**Treatment of Intestinal Lambliasis by Naphthalin.**]*—Policlinico.* Sez. Prat. 1931. Feb. 2. Vol. 38. No. 5. pp. 156-157. [1 ref.] [Med. Clinic, Catania.]

The author maintains that, in some cases at least, *Giardia* is pathogenic. He relates one case in detail and mentions briefly four others, in all of which *Giardia*, in vegetative or cystic form, were numerous in the faeces. Two had no intestinal disturbance, but others complained of abdominal pain and discomfort, flatulence, diarrhoea alternating with constipation and loss of weight. In the one detailed 20-30 *Giardia* were seen in a single field of the microscope. After trying stovarsol, yatren and rivanol without effect, he gave naphthalin, purified by sublimation, in doses of 20 cgm. thrice daily after food. In 5-6 days there was much improvement and after 10 days all symptoms had disappeared and the protozoon was no longer detected in the stools; two months later they had not reappeared. The other patients responded equally well and the author regards naphthalin as specific for this condition.

H. H. S.

KRITSCHESKI (I. L.), GRÜNBAUM (F. T.) & SCHAPIRO (S. L.). Ueber die Natur der Immunität beim Rückfallfieber. X. Der Einfluss der Ausschaltung des retikuloendothelialen Systems aus dem Organismus auf die Erreger der Infektion. [**Immunity in Relapsing Fever. Influence of Blocking of R.E.S. on the Agent of the Infection.**]*—Krankheitsforschung.* 1930. Mar. Vol. 8. No. 2. pp. 113-136. With 28 text figs. [17 refs.] [Microbiol. Research Inst., Education Commissariat R.S.F.S.R., Moscow.]

This contribution is devoted to the investigation by histological methods of the organs of mice infected with *recurrentis* after splenectomy and blockade and subsequently sacrificed at various stages of infection. The method of tissue fixation and staining was as follows:—

Fix in 5 per cent. formalin 24 hrs. Wash. Water-free pyridin 24-72 hrs. Wash. 24 per cent. gelatin solution containing 1 per cent. carbolic crystals 1-2 hrs. at 37° C. Fixation of gelatinized tissues in 20 per cent. neutral formalin 72 hrs. Wash. Freezing microtome. Sections in 96 per cent. alcohol 1 hr. Wash three or four times. Sections in 5 per cent. uranium nitrate 2-3 hrs. at 37° C. 1 per cent. silver nitrate 3-18 hrs. Transfer sections to dish containing 25 cc. of 0.25 per cent. freshly prepared silver nitrate to which has been added 15 cc. of 70 per cent. gum arabic solution. Prepare at same time 15 cc. of 5 per cent. hydroquinone and 15 cc. of 70 per cent. gum arabic. This second mixture is now added to the dish containing the sections. Watch the reduction. Quickly wash in distilled water. Transfer to slide. Dry with filter paper, acetone, xylol, balsam.

Numerous excellent microphotographs are provided showing the disposition of the spirochaetes in the organs of splenectomized and of normal mice and the findings of this elaborate investigation support the interpretation that removal of R.-E. tissue does in fact hold up the physiological disappearance of spirochaetes. In the splenectomized and blockaded animals the organ sections show enormous numbers of spirochaetes disposed in strings and felt-like masses indicating a massive proliferation which is not observed, at least at corresponding stages, in the unblockaded animals. The explanation assigned is that owing

to the removal of R.-E. tissue, lytic antibodies are not formed in adequate amount.

J. C. G. Ledingham.

KRITSCHESKI (I. L.), SEMZOVA (O. M.) & RATNER (M. I.). Ueber eine noch unbekannte Funktion des retikuloendothelialen Systems. XI. Die Unabhängigkeit der die chemotherapeutische Wirkung bestimmenden Funktion des Retikuloendothels von der Abwehrfunktion. [**Chemotherapeutic Function of R.E. System is independent of the Defence Function.**—*Ztschr. f. Immunitätsf. u. Experim. Therap.* 1930. Vol. 67. No. 5/6. pp. 417-434. [9 refs.] [Microbiol. Research Inst., Education Commissariat R.S.F.S.R., Moscow.]

Any criticism of the views of Kritschewski and his colleagues is usually followed promptly by the publication of a fresh batch of experiments supporting the original thesis of the authors. Here, Kritschewski, Semzova and Ratner take up the challenge of KIKUTH and REGEN-DANZ that a chronic relapsing form of trypanosome infection rather than a quickly fatal form must be chosen if one is to prove that the efficacy of a chemotherapeutic remedy depends on the intactness of the R.-E. system. They select therefore *T. gambiense* infection in mice for further *ad hoc* experiment and find that splenectomy carried out during the first or second crisis does not affect the course of the disease but seriously affects the therapeutic potency of the drug used (salvarsan). They also extend their work to *Sp. usbekistanica* infection in guineapigs and report that 90 per cent. of the splenectomized guineapigs but only 15.3 per cent. of normal animals were not rendered sterile by salvarsan.

J. C. G. Ledingham.

TSCHERIKOWER (R. S.). Von der Bedeutung des retikuloendothelialen Apparates bei Infektionskrankheiten. VII. Das retikuloendotheliale System bei Trypanosomeninfektionen. [**The R.E. System in Trypanosome Infections.**—*Ztschr. f. Immunitätsf. u. Experim. Therap.* 1930. Vol. 68. No. 1/2. pp. 182-192. [6 refs.] [Microbiol. Research Inst., Education Commissariat R.S.F.S.R., Moscow.]

In this contribution the view of the Moscow school that in trypanosome infections the R.-E. system plays no part in defence is upheld and critics of this view such as KIKUTH and REGEN-DANZ, NIESCHULZ and WAWO-ROENTOE [see previous reviews] are reminded that KRITSCHESKI and SCHWARTZMANN's original claim referred only to mice. The author now reports a further series of experimental results showing that removal of the spleen does not affect the course of trypanosome infections in mice (*T. evansi* and *T. suaru*) and that it matters not whether the trypanosome is introduced intraperitoneally or subcutaneously. In rats, also, splenectomy does not affect the course of *T. evansi* infection but it is admitted that after infection with *T. gambiense* the course of the disease in splenectomized animals is somewhat more acute, particularly if the route of injection is intraperitoneal.

J. C. G. Ledingham.

GILMOUR (C. C. B.). **A Case of Melioidosis in Singapore.**—*Malayan Med. J.* 1931. Mar. Vol. 6. No. 1. pp. 12-13.

A patient sent into hospital in a moribund condition as one of suspected smallpox proved on bacteriological examination to be one of melioidosis. The history was of a fever lasting about 7 days and of a rash on the 5th day of illness. Examination after death showed by the distribution, type and severity of the rash that this was not a case of smallpox. The rash consisted of firm tense pustules varying from $\frac{1}{8}$ to $\frac{1}{4}$ inch in diameter, not umbilicated nor crenated, and without definite areola. Papules, vesicles and pustules were all present. "These pustules were situated on the face, where they were thickest on the cheeks, least on the forehead, and there were only a few on the nose and neck. On the abdomen they were more numerous than on the chest. . . . There were a few pustules on both arms, and on the back, but none on the forearms or hands. There were two pustules in the groins, a few on the thighs and none on the legs and feet." An area of consolidation at the base of one lung was the only other lesion found post mortem. No cases of melioidosis have been found among rats examined in Singapore in connexion with plague.

W. F. Harvey.

ROGERS (Leonard). **Result of the Forecast of Cholera, Smallpox and Plague Incidence in India in 1930, and New Forecast for 1931.**—*Indian Med. Gaz.* 1931. Feb. Vol. 66. No. 2. pp. 61-65. [Summary appears also in *Bulletin of Hygiene.*]

With few exceptions the forecast for 1930 has proved to be substantially correct especially as regards cholera and plague. The methods by which the forecasts are made have been described in previous papers (see this *Bulletin*, Vol. 28, pp. 38 & 39). For 1931 the predictions for plague are low incidence in Bihar, the United Provinces and the South Deccan, about average figures for the Central Provinces and the North Deccan, and some excess over recent prevalence in the Punjab. For cholera no very serious epidemics are anticipated during 1931, or in the case of Assam, Bengal and South East Madras during the cholera season of these areas from November 1930 onwards. No very severe epidemic of smallpox is probable during 1931.

H. M. Woods.

BELFORT (Fabio) & DA SILVEIRA (Fleury). Nota sobre a inoculação do trachoma. [**The Inoculability of Trachoma.**]—*Brasil Médico.* 1930. Dec. 20. Vol. 44. No. 51. pp. 1411-1414. [2 refs.]

The authors obtained their material for inoculation from a trachoma patient. *Staphylococcus albus* was present at first, but this was got rid of by 10 per cent. argyrol before the experimental material was taken. This was then inoculated on the nasal mucosa of a volunteer with negative result, but on the conjunctiva of another volunteer the disease developed to a florid state in 9 days, with chemosis and abundant mucopurulent secretion. Staphylococci and corynebacteria were present. Repeated inoculations on and in the conjunctiva of rabbits and a macaque produced a little hyperaemia only, no signs of trachoma. The author concludes therefore that trachoma is transmissible directly

from man to man, that the organisms of Weekes and Morax-Axenfeldt found in acute conjunctivitis play no part in trachoma, that inoculation must be directly on to the conjunctiva, that no initial trauma is necessary, the virus being capable of active penetration, and that adults are equally as susceptible as children (the volunteer was 55 years old), but are less often attacked because of their cleaner habits.

H. H. S.

THIM (Josef R.). Ätiologisch-morphologische Forschungsergebnisse ueber Trachom und verwandte Einschlusskrankheiten. [**Research in Trachoma and Similar "Inclusion Diseases."**—43 pp. With 6 coloured plates. 1930. Pécs: Druck der Dunántúl Buchdruckerei und Verlags A.-G.

The study of films of exudates from cases of urethritis and conjunctivitis in adults and infants soon after birth and from cases of trachoma has convinced the author that a group of diseases exists which can be described under the general name inclusion diseases because of the occurrence of bodies resembling those originally described by PROWAZEK in trachoma. He distinguishes five distinct conditions—genital inclusion blennorrhoea, inclusion blennorrhoea of the newly born, inclusion catarrh of adults, swimming bath conjunctivitis and trachoma. Various stages in the evolution of these inclusion bodies or organisms are described. It is claimed that definite encystment has been demonstrated and that this proves the protozoal nature of the organisms. The paper is illustrated by six coloured plates which show clearly with what the author has been dealing. [Some of the structures depicted are undoubtedly organisms—bacteria in some cases, and flagellated protozoa such as not infrequently contaminate films owing to the use of impure water, in others. The remainder are granules of various sizes and colours grouped or scattered in the cytoplasm of cells, round blue bodies with or without one or more blue or red granules and lying free or within vacuoles in the cytoplasm of cells, large granular pink bodies and other structures. The author is undoubtedly convinced of the accuracy of his observations and the conclusions he has reached but it will require more evidence than that given in his paper and in the excellent coloured plates to convince the majority of his readers that he has not been dealing with bacteria, fragments of the cytoplasm of cells, residues of phagocytosis and extraneous organisms.]

C. M. Wenyon.

CHESTERMAN (Clement C.). **Tropical Myositis.** [Correspondence.]—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1930. Nov. 25. Vol. 24. No. 3. pp. 359-360.

Dr. Chesterman gives brief details of two cases seen at Yakusu, Stanleyville, where loa and perstans infections are common, but *F. bancrofti* much less so. He regards the disease as "a cutaneous staphylococcal infection with metastatic inflammatory foci in muscles which may be determined by trauma or by the irritation caused by parasites."

A. G. B.

TJOKRONEGORO (R. M. Hadjidharmo). **Specifiekte rheumatische hartafwijkingen op Java. [Specific Rheumatic Disease of the Heart in Java.]**—*Geneesk. Tijdschr. v. Nederl.-Indië*. 1930. Dec. 1. Vol. 70. No. 12. pp. 1213-1218. With 4 figs. on 2 plates. [10 refs.] [Med. High School, Batavia, Java.]

A native, aet. about 40, who had suffered from a polyarthritis 7 months previously, died apparently from paratyphoid A (bacteriologically established). Post mortem a chronic endocarditis and pericarditis was found with typical Aschoff's nodules in the connective tissue of the heart. SOETEDJO (see this *Bulletin*, Vol. 24, p. 70) examined 19 hearts with endocarditis in one of which the typical nodules were found. The author found an additional series of 28 hearts negative. Rheumatic disease of the heart is rare in Java.

W. J. Bais.

TURNER (A. W.). **Black Disease (Infectious Necrotic Hepatitis) of Sheep in Australia : a Toxaemia induced by a Specific Bacterium (*B. oedematiens*) in Hepatic Lesions resulting from the Migration of Young Liver Flukes (*F. hepatica*).**—*Commonwealth of Australia. Council for Scient. & Indust. Res. Bull. No. 46*. 141 pp. With 52 figs. (1 map). [140 refs.] 1930. Melbourne.

Black disease is defined as "an acute infectious disease of sheep . . . caused by localized infection of the liver, in areas of necrosis, with *B. oedematiens* usually alone but in rare cases associated with other anaerobic organisms and apparently always associated with invasion of the liver by immature, wandering liver flukes (*Fasciola hepatica*). The annual losses attributed to it in Australia may exceed a million pounds. The interest for human medicine resides in the association with wandering flukes and the experimental evidence that other liver-injuring factors such as wandering cysticerci and chemical liver irritants may produce a similar disease. The bacillus is present in the organ in a latent state in animals which have grazed over infected pastures, but such carriers only develop the infection when a *locus minoris resistentiae* is established in a spore-bearing organ.

This fine memoir deals exhaustively with the disease and should be consulted by interested persons.

A. G. B.

- i. KUMM (Henry W.). **A Discussion of the Recent Literature on Infectious Epidemic Diseases associated with Jaundice.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1931. Jan. 31. Vol. 24. No. 4. pp. 421-428. [44 refs.]
- ii. BEEUWKES (Henry), WALCOTT (A. M.) & KUMM (H. W.). **An Obscure Epidemic Disease associated with Jaundice, observed in Nigeria, West Africa.**—*Ibid.* pp. 429-451. With 3 figs. (1 map). [2 refs.]
- iii. HUDSON (N. Paul). **Histopathology of an Epidemic Disease associated with Jaundice, occurring in Nigeria, West Africa.**—*Ibid.* pp. 453-460. With 6 figs. on 2 plates. [9 refs.]

These papers owe their origin to an epidemic of jaundice which occurred in the Kukuruku area of Nigeria, and was investigated by

the yellow fever experts of the International Health Division of the Rockefeller Foundation in West Africa.

i. "It is evident from this review that there is a marked confusion in the terminology connected with epidemic jaundice diseases. When we made an attempt to compare the disease studied in West Africa with conditions seen elsewhere, we found that the term 'infectious jaundice,' excluding Weil's disease, was used to denote a variety of jaundice conditions that had been called infectious because of their occurrence in epidemics. The disease we described had points of similarity with one or another of the reported maladies, but cannot be correlated with any particular epidemic until more is known about their specific causes.

"When we turned to the literature on 'catarrhal jaundice,' we found a continuation of the same confusion. The study brought out that, 'epidemic catarrhal jaundice' and 'infectious jaundice' (not including Weil's disease or bacterial jaundice) are acute specific diseases of unknown etiology, and may even be the same disease."

ii. "1. An epidemic of an obscure disease associated with jaundice and accompanied by a mortality of 5.7 per cent. was encountered in the Kukuru Division of Nigeria, West Africa.

"2. The affection is liable to be confused with yellow fever as it resembles the latter, and some cases cannot be differentiated clinically, though the symptomatology is generally less marked, and the albuminuria is relatively mild. Sera from convalescents fail to afford protection against the virus of yellow fever.

"3. The etiology is unknown, and the epidemiology obscure. No causative organism was isolated, and susceptibility of the usual laboratory animals was not demonstrated. Though certain epidemiological features suggest an insect vector, droplet contamination from close personal contact and infection from fomites were not definitely ruled out. Pfeiffer tests with *L. icterohaemorrhagiae* and agglutination tests with *B. typhosus* and *para-typhosus* A and B, as well as with *B. abortus* and *M. melitensis*, were negative.

"4. The resemblance of this disease to infectious epidemic jaundice other than Weil's disease, or its possible identity with infectious epidemic jaundice, should be borne in mind.

"5. The pathology studied in three cases apparently differs from that of any disease associated with jaundice previously described."

iii. "Summary of Principal Findings.—The liver shows irregular necrosis of parenchymatous cells, inflammatory reaction, regeneration, and bile stasis, while the kidneys present cloudy swelling, necrosis and mild fatty degeneration of the parenchyma, congestion, and bile-staining, with debris and a few hyaline casts in tubular lumina. In the spleen there are irregular congestion, necrosis and inflammatory reaction in germinal centres, with increase in endothelial leucocytes (mononuclears) and plasma cells in the pulp are noteworthy features, while the heart shows cloudy swelling and fatty degeneration of its muscle fibres. The lungs are congested, and small localized areas of inflammatory reaction are evident. In the stomach the material on the mucosal surface is suggestive of altered blood, and in the lymph node congestion and phagocytic endothelial leucocytes are present in blood spaces. Organs without significant changes comprise the pancreas, adrenal glands, and uterus.

"Bacteria were not seen in the paraffin sections. Levaditi preparations were searched for spirochaetes and leptospira without success. Guineapig tissues used to control the staining technique showed large numbers of *Leptospira icterohaemorrhagiae*."

The author writes: "We were unable . . . to make a definite pathological diagnosis, and the identification of the disease must await further work in the large field of jaundice conditions in which the etiological agent has not been determined. In a differential diagnosis, we believe we have

excluded yellow fever, Weil's disease, relapsing fever, acute yellow atrophy of the liver, and so-called catarrhal jaundice."

A. G. B.

MARMO (Achille). Il "bigio" in Eritrea. [**"Bigio" in Eritrea.**]—*Ann. di Med. Nav. e Colon.* 1931. Mar.-Apr. Year 37. Vol. 1. No. 3-4. pp. 164-167. [2 refs.]

This condition has been seen in Somaliland (see this *Bulletin*, Vol. 27, p. 167), but these are the first cases described from Eritrea. The characteristics are a slow growing lesion of the mucous aspect of the lower lip, semilunar in shape, reddish in colour, an erosion with shallow ulceration, never extending to the skin. It is painless, does not itch and does not set up affection of the associated lymphatic glands. It is not syphilitic (at all events the W.R. is negative), nor tuberculous, no leishmania are found, nor any moulds—in short, no cause is known. Of the two cases here described one was a man of 25 years who stated that the first sign had appeared a year previously; the second was a child of 7-8 years, with a history of the gradual spread of the lesion during 4 years, for the first two of which it had remained quite small. There was no rise of temperature; a serous secretion would form yellowish crusts on the surface. Examination of sections and by cultural attempts yielded entirely negative results. As in the previous cases injections of neosalvarsan were tried, also antimony tartrate locally in 3 per cent. solution, and later stibosan injections (three of 0.1 gm. each) but without producing any amelioration.

H. H. S.

BERGSMA (Stuart). **Gastric and Duodenal Ulcer in the Black People of Abyssinia.**—*Arch. Intern. Med.* 1931. Jan. Vol. 47. No. 1. pp. 144-148. [6 refs.] [Amer. Mission Hosp., Addis Ababa, Abyssinia.]

Gastric and duodenal ulcers are generally regarded as rare among negroes; in New Orleans records gastric ulcer was 20 times as rare among negroes as among whites and statistics of a New York hospital give 44 cases of duodenal ulcer, none of them among negroes. Among the black people of Abyssinia however these conditions are common. In two years some 200 patients with acute and chronic gastric and duodenal ulcers have visited the Clinic of the American Mission Hospital, and 16 have consented to operation. All but one had multiple healed ulcers and occasionally an ulcer in the acute or chronic stage; the pyloric region was converted into a hard scarred fibrotic ring with the lumen greatly constricted. Posterior jejunosomy was performed. At the King of Abyssinia's hospital experience is similar and in two years there has been no case of gastric or duodenal ulcer in a white person. The chief difference between the American negro and the Abyssinian is the diet, which consists in Abyssinia of heavy sour bread and a sauce that is approximately 50 per cent. Cayenne pepper, with occasional beans and slightly cooked or raw meat. Pepper as a regular diet, the author observes, is likely to cause gastric derangement. He discusses the bearing of these observations on the pathogenesis of gastric ulcer.

A. G. B.

PORDON (A. A. A. C.). Een scheurbuikexplosie onder de gevangenen te Muntok. [**An Outbreak of Scurvy among Prisoners at Muntok (Banka, D.E.I.)**].—*Geneesk. Tijdschr. v. Nederl.-Indië*. 1931. May 1. Vol. 71. No. 5. pp. 463–467.

Pordon quotes very briefly 16 cases in which he ventured to diagnose scurvy, though the evidence is very poor and the majority of the patients showed subjective symptoms only. In the other cases the possibility of some type of purpura is not taken into consideration. The dietary in the prison was not deficient as regards vitamin C; auxiliary hypothetic factors (aversion of the prisoners to vegetables, overcooking of the food, influence of lack of light in the rainy period during which the cases occurred) are necessary to give an explanation of this epidemic outbreak of alleged avitaminosis C.

W. J. Bais.

DYCHITAN (Teodoro). **Contribution to the Work on Lapnus from the Point of View of its Epidemiology and History of its Discovery.**—*Jl. Philippine Islands Med. Assoc.* 1930. Nov. Vol. 10. No. 11. pp. 481–487.

Lapnus, which means "peeling of the skin," is a common affection in the Island of Mindoro, has been hitherto regarded as an eczematous complication of malaria and is thought by the author to be pellagra. It prevails from March to August and disappears in September. It is attributed by the author to the use of rice stored undried, together with poverty which forbids the use of other food. The mortality is from 50 to 60 per cent. Five cases are briefly described, all in members of one family. In all but one there was burning sensation of the soles of the feet, followed by peeling of the skin, "like the sole of a slipper." In two instances the initial symptoms were stomatitis, gastralgia with pyrosis, formication and weakening of the lower limbs, and in two others apathy, somnolence and melancholy. Gradual loss of hair was usual. The fifth case was that of a child of two years who died in a month of inanition after vomiting; here again the skin of the soles peeled. Opacity of the cornea sometimes occurred. The patients treated themselves with sea water containing lemon juice, which, they found, gave relief. The author stresses the periodicity of the symptoms.

A. G. B.

- i. BORCHARDT (W.). Beiträge zur Klimaphysiologie und -Psychologie der Tropen. [**Tropical Climatology**].—*Arch. f. Schiffs- u. Trop.-Hyg.* 1929. Vol. 33. No. 10. pp. 505–532. [38 refs.] [Inst. for Ship & Trop. Diseases, Hamburg.]
- ii. RONNEFELDT (F.). Material zur Frage der Akklimatisation von Frauen und Kindern im tropischen Westafrika.—*Ibid.* 1930. June. Vol. 34. No. 6. pp. 319–323. [St. Timothy's Hosp., American Mission, Cape Mount, Liberia.]
- iii. BORCHARDT (W.). Grundumsatz und spezifisch-dynamische Wirkung im künstlichen Tropenklima.—*Ibid.* May. No. 5. pp. 258–262. [10 refs.] [Inst. for Ship & Trop. Diseases, & Physiol. Inst., Univ., Hamburg.]

- iv. BORCHARDT (W.). Blutmengen- und Alkalireservebestimmung im künstlichen Tropenklima.—*Ibid.* June. No. 6. pp. 327-330. With 1 text fig. [6 refs.] [Inst. for Ship & Trop. Diseases, & Physiol. Inst., Univ., Hamburg.]
- v. KESTNER (Otto) & BORCHARDT (Werner). Klimauntersuchungen in den Tropen.—*Klin. Woch.* 1929. Vol. 8. pp. 1796-1801. [24 refs.] [Physiol. & Trop. Inst., Hamburg.]
- vi. BORCHARDT (W.). Die Magenfunktion im künstlichen Tropenklima. (Nach Versuchen an Tieren und Menschen).—*Ibid.* 1930. May 10. Vol. 9. No. 19. pp. 886-888. [10 refs.] [Inst. for Ship & Trop. Diseases, Hamburg.]
- vii. ——. Experimentelle Beiträge zur Klimaphysiologie der Tropen.—*Beihefte z. Arch. f. Schiffs- u. Trop.-Hyg.* 1929. Vol. 33. No. 3. pp. 248-253 (332-337).
- viii. PARJONO, RADSMA (W.) & JOENES (M.). Das Sauerstoffbindungsvermögen der Eisengehalt und der Hämoglobingehalt des Blutes bei den Tropenbewohnern.—*Arch. Neerlandaises de Physiol. de l'Homme et des Animaux.* 1930. Vol. 15. pp. 73-96. [25 refs.] [Med. High School, Weltevreden.]
- ix. VAN BERKHOUT (P. J. Teding). **Determination of Rest-Nitrogen in the Blood of Inhabitants of the Tropics.**—*Meded. Dienst d. Volksgezondheid in Nederl.-Indië.* 1930. Vol. 19. Pt. 1. pp. 30-43. With 1 text fig. & 2 figs. on 1 plate. [9 refs.]

These papers record investigations into the effect of the climate *per se* on otherwise healthy residents in the tropics.

i. Borchardt enumerates as the essential data for the successful acclimatization of Europeans: (1) Health; (2) Quinine tolerance; (3) Cardiac efficiency; (4) Sweating capacity; and (5) Temperament. He maintains that women on the whole do not do well, largely on account of increased disturbances of the genital system.

ii. Ronnefeldt, as a result of his carefully documented experience, disagrees with this, and considers the evidence brought forward in support of the contention insufficient. He also records it as his opinion that native women suffer as much as European in this respect.

iii. Borchardt finds that basal metabolism is not decisively affected. In these and many other experiments he records the reactions of male Europeans in a sweating chamber, in which the conditions of the climate of low-lying tropical regions are imitated by raising the temperature to 33° C., and the relative humidity to 95-98 per cent. The specific dynamic protein reaction is determined with a special diet intended for further experiments among vegetarian tribes, and was found to be demonstrable at ordinary room temperature, and to some degree slightly retarded in the sweating chamber.

iv. Borchardt finds that in the acute sweating experiments the total quantity of the blood is increased by 8.4 per cent.: the plasma by 13 per cent. and the erythrocytes by 4.7 per cent. Profuse sweating also means increased loss of Ca, K, and Na, and the alkali reserve is diminished.

v. With Kestner he found the degree of U.V. radiation in the Cameroon lowlands not commensurate with the height of the sun. They consider that pigmentation of the skin is a definite protection against heat, and that the increased cutaneous circulation in the heat regulation of the body occurs at the expense of the splanchnic blood supply, with a corresponding detrimental effect on the activity of the digestive organs.

vi. Borchardt determines in further experiments in the sweating chamber that the secretion and motility of the stomach are diminished very appreciably in man and animals (dogs), that the retention of the gastric contents is prolonged, and that the addition to the test meals of spices (curry and pepper) counteracts this, probably by increasing the blood supply of the organs concerned.

vii. Borchardt points out the importance of efficient heat regulation of the body in the process of acclimatization. In the sweating chamber, he found that good sweaters do not become hyperthermic, and vice versa. He maintains that this simple experiment should be adopted in deciding tropical fitness, and states that it also facilitates the elimination of those subject to vasomotor disturbances and neurasthenia. To counteract the diminished alkali reserve, which he considers an important factor in the causation of exhaustion in the tropics, he recommends the substitution of plant ash for salt in the diet.

viii. Parjono, Radsma & Joenoes record their findings as regards the Hb content of the blood estimated by determining its iron content and oxygen capacity, which give more accurate results than the hemoglobinometer (Sahli). While they find that the oxygen capacity, 21.4 per cent. for Europeans, 21.6 per cent. for natives, is higher than any recorded in Europe and America above 38° N. latitude (varying from the lowest): 18.5 per cent. (HALDANE, London) to 21.2 per cent. (HADEN, Kansas City), and that the iron content, Europeans 0.0531 gm. per cent., natives 0.0542 gm. per cent., is also higher than the *average* recorded in the same latitudes, they assign no cause for the difference.

ix. Van Berkhout finds after an elaborate investigation, by calorimetric and titrimetric methods into the rest-nitrogen of Europeans and natives, that the results do not point to a difference between the two. Both papers supply a detailed account of the technique employed.

G. E. H. Le Fanu.

PAWAN (J. L.) & CAMPS-CAMPINS (J.). **Notes on the Serum Calcium of Inhabitants of Trinidad, B.W.I.**—*Ann. Trop. Med. & Parasit.* 1931. Mar. 31. Vol. 25. No. 1. pp. 91-98. [6 refs.] [Govt. Bact. Lab., Trinidad.]

"1. The serum calcium in Trinidad of 74 persons—healthy and sick—averaged 10.15 mg. per 100 cc

"2. Of 24 normal healthy individuals it averaged 10.74.

"3. There was a definite diminution in the serum calcium of persons with general debility and ulcers, whereas persons with ulcers and otherwise in good health show a rise above the normal.

"4. Nephritis cases show a low serum calcium—in some cases very low.

"5. In dental cases the serum calcium shows great variation."

A. G. B.

ASHESHOV (Igor), TAYLOR (J.), MORISON (J.), MALONE (R. H.) & IYENGAR. *Recherches sur le bactériophage dans l'Inde Britannique.* [Communication faite . . . par le Major-Général J. D. Graham, C.I.E., I.M.S. . . . Délégué de l'Inde Britannique.] [**Investigations into Bacteriophage in India.**—*Bull. Office Internat. d'Hyg. Publique.* 1930. Oct. Vol. 22. No. 10. pp. 1882-1892. [3 refs.]

A summary is given of separate researches conducted by different workers.

Asheshov with the collaboration of Drs. Saranjam Khan and Lahiri finds that after the action of a pure cholera bacteriophage on a culture, with production of lysis, a secondary resistant strain of vibrio develops ; this secondary culture is itself, however, susceptible to the action of a second strain of bacteriophage. Altogether 3 types of pure bacteriophage have been isolated, A, B and C, with reciprocal relations, that is to say, the third bacteriophage will cause solution of cultures of cholera which have developed resistance to any of the other two. With this fact established, it became a simple matter to devise technique for typing bacteriophages even in mixed culture and of estimating the number of corpuscles of each type of bacteriophage existing in such a mixture. As no one bacteriophage gives a permanent lysis of a cholera culture and as a combination of two gives such lysis only rarely, it is obvious that a mixture of the three types is indicated for purposes of prophylaxis and treatment. Most of the races of type A with rapid action are rather unstable and if stable are not sufficiently polyvalent. Endeavour is being made to find an omnivirulent mixture of bacteriophages with respect to the different strains of cholera vibrios freshly isolated, which shall produce permanent lysis in less than 2 hours and remain active for 4 or 6 months.

Taylor's work extended to both cholera and dysentery but in the case of cholera applied to the sporadic and not to the epidemic form. The cholera cases were definitely diagnosed as such and the vibrio isolated. A therapeutic bacteriophage of high activity was employed. The results showed that development of the bacteriophage was not essential to the cure of cholera and that administration of a bacteriophage capable of causing lysis of the vibrio isolated was without influence on the course of the disease. In the case of dysenteries, both of Shiga and Flexner types, in which proper controls were set up, there does not seem to have been any effect upon the disease traceable to the administration of bacteriophage therapeutically.

Morison used bacteriophage prophylactically in dysentery, with the result that only 5 cases occurred in 192 persons treated as against 28 out of 169 controls. In three epidemics in which bacteriophage was used therapeutically there were 15 deaths out of 57 treated and 50 deaths out of 92 untreated.

W. F. Harvey.

VAN LOON (F. H. G.). **Protopathic-instinctive Phenomena in Normal and Pathological Malay Life.**—*Brit. Jl. Med. Psychology*. 1928. Vol. 8. pp. 264-276. [Summary appears also in *Bulletin of Hygiene*.]

The main mental differences between races are said not to be those of the upper levels of the human mind ; they lie in the basic foundations of vital and instinctive tendencies. Among Malaysans van Loon found that amok runners were often suffering from some infectious disease and that the symptoms were those of hallucinatory confusion, patients being impelled to flight and attack as reactions to imagined dangers and the agony and terror caused thereby. In latak a strong emotion, especially fright, causes the Malay woman to enter into a state of "hyper-imitativity" in which self-control is lost. The patient imitates everything done before her or said to her. Particularly interesting points are that latak is almost exclusively confined to

Malay women and to those who have passed long periods in subordinate positions. Many patients declare that their symptoms, of an anxiety character, had begun in youth and had been associated with sexual experiences.

The symptoms of latak have a primitive character and may be regarded as evidence of regression to mental levels ordinarily overlaid by more recently acquired and more complicated mental developments.

E. D. Macnamara.

LEFROU (G.). Un nouvel indice de robusticité chez les noirs. [**A New Index of Robustness for African Natives.**—*Bull. Soc. Path. Exot.* 1931. Jan. 14. Vol. 24. No. 1. pp. 60–67. [3 refs.]

In selecting men for some particular object an index arrived at by some simple method may be useful. For military recruiting in France Pignet's index is used, which is Height in cm. less (Weight in kg. added to Chest Circumference in cm.). A figure below 10 is very strong, 11 to 15 strong, 16 to 20 good, 21 to 25 medium, 26 to 30 fair, 31 to 35 poor, above 36 very poor.

In attempting to apply this index to African natives it was found unreliable and according to the author attempts at readjustment suggested up to date are also unsatisfactory. That some method is necessary according to the author is exemplified by an example cited—Natives for work on the Congo railway were brought from Lake Chad and after *six months* en route were found unfit and had to be sent back [what natives would be fit after six months' travelling?]. It was found necessary to take into account the relative proportions of the body of the native as compared with those of a European and having realized that the native is relatively longer in the limb and shorter in the trunk than the European the author suggests a modified Pignet index as follows:—"Pignet sitting" = (weight plus circumference of chest) less sitting height, the following being his new scale: 70 and above—very strong, 69 to 65 strong, 64 to 60 good, 59 to 55 medium, 54 to 50 fair, 49 to 45 poor, 44 to 40 very poor. "The value of the new index corresponds with the impression of robustness as gauged by a glance at the subject." [No index is used, so far as is known, in recruiting troops or natives for work in British colonies. Some such method as that devised by the author might be of use to recruiters of labour but it would be necessary first to test the validity of the index in each tribe or group of tribes as they may vary very considerably in build. Even then the value of such an index may be lessened by a good many other factors and it is a question whether the impression gauged by a glance is not of greater value.]

H. S. S.

BERGSMA (Stuart). **An Unusual Complication of Typhus exanthematicus observed in Abyssinia.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1930. Nov. 25. Vol. 24. No. 3 pp. 355–356. [1 ref.] [American Mission Hosp., Addis Ababa, Abyssinia.]

The complication was massive gangrene of the lower extremities, which is described as not uncommon.

A. G. B.

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- BERNARD (Léon). La médecine et les médecins au Maroc.—*Bull. Acad. Méd.* 1931. Jan. 27. Year 95. 3rd Ser. Vol. 105. No. 4. pp. 115-123.
- BHANDARKAR (P. R.). Hedyotis Auricularia in Colitis with Special Reference to Human Amoebiasis and Cholera.—31 pp. With 1 fig. [8 refs.] 1930. Madras: Pharmacol. Research Inst., Post Box 504, Park Town.
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- CLELAND (J. Burton). Records of Australian Cases of Shark-Bite.—*Jl. Trop. Med. & Hyg.* 1930. Oct. 1. Vol. 33. No. 19. pp. 285-289. With 3 text figs. [8 refs.]
- DAGNINO (Vincenzo). Contributo alla nosografia del Gimma-Abba-Gifar (Etiopia).—*Arch. Ital. Sci. Med. Colon.* 1930. Oct. 1. Vol. 11. No. 10. pp. 613-620. English summary (6 lines).
- DICKENS (Paul Frederick). Liver Function Tests. A Plea for their Application in Tropical Medicine.—*Amer. Jl. Trop. Med.* 1929. Nov. Vol. 9. No. 6. pp. 489-492.
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- HABERFELD (Walther). Atypische Lymphdrüsenporocytose ("Blastomykose").—*Arch. f. Schiffs- u. Trop.-Hyg.* 1930. Oct. Vol. 34. No. 10. pp. 549-554. With 2 text figs.
- HARTSOCK (Frederick M.). Radiant Energy (Second Paper). Sprue and Pellagra.—*Milit. Surgeon.* 1930. Apr. Vol. 66. No. 4. pp. 523-526.
- HORN (Arthur E.). The Tropical Training of Sanitary Personnel.—*Jl. Roy. San. Inst.* 1930. Aug. Vol. 51. No. 2. pp. 91-98.
- KEATINGE (L. R. H.). A Case of Elephantiasis Scroti from Darfur.—*Jl. Roy. Army Med. Corps.* 1930. Nov. Vol. 55. No. 5. pp. 372-373. With 2 text figs.
- KNABE (Kurt). Eine kombinierte Yatren-Endojodin-Behandlung eines Falles von Lungen-Aktinomykose aus Mexiko.—*Arch. f. Schiffs- u. Trop.-Hyg.* 1930. Oct. Vol. 34. No. 10. pp. 539-542. [8 refs.]
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- SCHEIDER (Otto). Subtropische, unter dem Bilde der Syphilis oder des Sodo-kufiebers verlaufende Insektenstichinfektion.—*Arch. f. Schiffs- u. Trop.-Hyg.* 1931. Feb. Vol. 35. No. 2. pp. 109–110.
- SELF (P. A. W.) & CORFIELD (C. E.). The Determination of Total Alkaloids in Cinchona Bark.—*Quarterly Jl. Pharm. & Pharmacol.* 1930. July-Sept. Vol. 3. No. 3. pp. 410–416. [3 refs.]
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- STALDER (H.) & LAUTERBURG (M.). Unsere Erfahrungen in den Tropen. (Spital Dr. A. Schweitzer, Gabun, Lambarene A.E.F.).—*Muench. Med. Woch.* 1931. Apr. 10 & 17. Vol. 78. Nos. 15 & 16. pp. 637–639; 675–678.
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REVIEWS AND NOTICES.

PARSONS (Robert P.) [Lieut.-Com., M.C., U.S.N.]. **History of Haitian Medicine.** Foreword by Edward R. STIRT, Rear Admiral, M.C., U.S.N.—pp. xxviii+196. With 21 illustrations & 1 folding map. 1930. New York: Paul B. Hoeber Inc. [\$2.25.]

This small book, well printed on good paper and illustrated by a map and over a score of photographs, is an elaboration of a paper published in May 1929 in the *Annals of Medical History*, and is full of interesting information. Following a brief introduction is a chapter on the French Colonial Period and an account of Public Health, so-called, in the 18th century. The condition of things in the 19th century is well described in a chapter entitled *The Cost of Independence*, and the remaining five chapters deal with the years subsequent to the American occupation in 1915.

What would be an interesting period, the 17th to 19th centuries, cannot be described in any detail because records of that time are almost non-existent. Slaves were introduced from many parts of Africa "from the mouth of the Senegal at 17° N. on the west coast, round the Cape and up to the Mozambique at 10° S. on the east coast," bringing new diseases and Voodoo methods. Some space is devoted to yellow fever and REED, CARROLL, LAZEAR and AGRAMONTE are eulogized, but, as in most American works, no credit is given to, in fact here no mention is made of, the "poor man at the gate" who pointed the way, CHARLES FINLAY. For protection the Haitian of early days used necklaces of citrons and bags of camphor held to the nose; superstition dies hard and in the meningitis epidemic of 1928 the children wore similar necklaces or belts of citrons and adults used camphor inhalers when approaching strangers or meningitis patients. As early as 1802 Dr. DELORME recommended the filling of swamps, building of latrines, cleaning streets, planting trees and prohibition of throwing rubbish into ditches.

The century of independence, 1804-1915, was a time of cessation of progress, from the medical aspect; doctors were also politicians, lawyers and coffee growers, doctoring being the smallest ingredient, and, in the latter part of the 19th century, of the four classes of practitioners noted, those trained in France, those trained at the local school at Port au Prince, Health Officers with commissions from the President of the time, and pure charlatans, the last greatly predominated. As enlightenment progressed the local students, in addition to a degree or licence, demanded, not unreasonably, that they might also receive some teaching in medicine, and with the advent of Dr. LÉON AUDAIN matters began to improve. He started a medical journal, *La Lanterne Médicale*, which appeared every two months from 1899 to 1911, and he established a Laboratory of Parasitology and Clinical Bacteriology.

During 1910-1915, difficulties were great; there were constant revolutions, 7 presidents in rapid succession were deposed, assassinated or ran away. [The reviewer treated one of these for dysentery; a courtly old gentleman of 64 who complained of the quiet and depressing life of Jamaica. He related how, the day before his arrival, he had had to murder 16 prisoners in cold blood, after which he rifled the treasury and escaped, a few hours before the plot for his assassination was to be put into effect.] The salary of the dean of the medical school, nephew of a former president, was 80 dollars a month, that of the teachers 30, that of the chief surgeon 15, but none was paid regularly.

The Americans now took matters in hand; as the author states, with a curious mixture of metaphor: "This Augean stable . . . was a virgin field in which to apply the knowledge of every branch of medicine," and in the short space of 10 years "an unspeakable hot-bed of diseases has been transformed into a relatively clean and healthful land." Haiti's needs were summed up by Dr. P. W. WILSON as "soap, salvarsan, and

sunshine ; le bon Dieu furnishes the sunshine." Yaws was a great scourge.

Want of space forbids our detailing the methods employed—the application of modern hygienic measures with typical American thoroughness.

There is grave fear that when the American occupation comes to an end, progress will cease and retrogression begin, for the native Haitian shows no organizing or administrative ability, there is almost complete absence of "medical conscience" and total lack of scientific view-point ; empiricism is all in all.

H. H. S.

FRANCE : MINISTÈRE DE LA GUERRE. Direction du Service de Santé. **L'oeuvre du Service de Santé militaire en Algérie 1830-1930.** [The Work of the Military Health Service in Algeria, 1830-1930.]—363 pp. With 32 figs. [7 facsim. autographs] & 2 coloured plates. 1931. Paris : Charles-Lavauzelle & Cie, Boulevard Saint-Germain, 124.

From a preface by Médecin général inspecteur TOUBERT we learn the inception of this book. It is the work of 16 collaborators, doctors, pharmacists or administrators, who were serving at the time in Algeria and who write with a personal knowledge of the surroundings of the men whose work is commemorated. It starts with a chapter in which the medical work of the military health service of Algeria is summed up. In Chapter II is an account of the early struggles with disease ; Chapter III deals with the surgery practised in the period and in the last chapter is an historical account of the diseases studied with the lives and work of the early researchers, above all LAVERAN. The book forms a permanent record of the discoveries of the century in Northern Africa.

A. G. B.

LUKIS (Pardey), the late [K.C.S.I., Knight of Grace of the Order of St. John] & BLACKHAM (R. J.) [C.B., C.M.G., C.I.E., D.S.O., M.D., etc.]. **Tropical Hygiene for Europeans and Indians.** Revised and Enlarged by Lt.-Colonel A. D. STEWART, M.B., F.R.C.S.E., etc. Fourth Edition.—pp. xi+441. With frontispiece & 79 figs. 1931. Calcutta : Thacker, Spink & Co. for the St. John Ambulance Association, Indian Council. [Rs.5.]

To write a book on technical matters for instruction of the non-professional reader is probably one of the most difficult tasks for medical men to undertake. In the first place there is the ever-recurring problem as to its scope and no two are likely to agree exactly how much to include and what to leave out ; secondly, to be of real value the instruction must be to a considerable extent dogmatic ; thirdly, the information must be strictly accurate. These last two often tend to incompatibility.

Sixteen years have passed since the last edition of *Tropical Hygiene* was issued and though the original form has been retained as far as possible, the advances in public health, sanitation and hygiene have been so great, particularly in tropical countries, that the work of revision and bringing up to date, undertaken by Lt.-Colonel Stewart, must have been arduous. As the book has been enlarged by nearly 50 per cent. the present edition may almost be looked upon as a new work. An introductory chapter has been inserted treating of the history of public health administration from Greek and Roman times, traversing the hygienically dark era of the Reformation down to our own day, first in England, then in India, and it has been brought so up to date as to include the report of the Simon Commission of 1930. Further additions comprise brief sections on sprue, filariasis,

relapsing fever, leprosy and typhus ; there are new chapters on Maternity and Child Welfare, School Hygiene, Personal Hygiene, and the International health relationships of India ; that on Insects has been entirely revised and that on Camp Hygiene enlarged to discuss Fairs and Melas and their connexion with disease. The Malaria chapter has been practically re-written, and whereas in the old edition, that on Air dealt with its chemical constitution, with the products of respiration, air-space requirements and purification, these are now omitted as being " too technical for the scope of the book " and have been replaced by a general talk, probably equally instructive and certainly more interesting to the laity.

It is with no intention of carping criticism that we call attention to a few points which are likely to be misinterpreted by, and so may mislead, the man in the street. " Fortunately for us, the bacillus of tuberculosis is an exceedingly delicate organism . . . and it is nearly always killed by complete drying " (p. 39). Nothing is said of its having a waxy envelope to resist such drying and the fact of its delicacy would seem to be contradicted later in the book when, under disinfection we find : " Immersion in a 20 per cent. hot solution of washing soda suffices, however, for most infectious diseases, but it will not serve in cases of infection by the tubercle bacillus " (p. 323). Again, though pneumonic plague is mentioned (p. 26), on the following page is the surprising dictum " a plague patient is not infectious and there is no need for being afraid of going near him." Again, enteric carriers " may be harmless *unless they have to do with food supplies* " (p. 33 ; italicized in text). This is too sweeping. The reviewer personally investigated the case of a carrier, a music teacher, who was responsible for infection in 4 houses which she visited to instruct the children, and in another instance where a musketry instructor infected 6 of his small squad (4 died), probably by handling their gunstocks without adequately washing his hands after defaecation. In the section on Rabies (p. 388) : " If the biting animal remains alive and well for 10 days after biting a human being . . . there is no danger that the person bitten will contract hydrophobia. In such cases, therefore, there is no necessity for treatment." This ignores altogether the possibility of " intermittent rabies " and the danger of ceasing treatment because the animal remains alive and well for 10 days (see this *Bulletin*, Vol. 24, p. 223). Minor points which may be mentioned in passing, for attention in the next edition, are : that sprue " is probably an infection with the bacillus of dysentery " (p. 23) ; that the " duration of infectivity in yellow fever is from the 3rd to 6th day of fever " [it is given correctly on p. 80] ; that D'HERELLE was the discoverer of bacteriophage (p. 15). TWORT (1915) anticipated him by two years, though it is true that the studies of D'HERELLE on dysentery (1917) first stimulated interest in the problem. The *Tropical Diseases Bulletin* is misnamed (p. 229).

In reviewing a book with so many good points it would not be fair to end on a carping note. The chapter on vitamins is new and quite adequate, that on clothing is good, useful and sensible, without too much detail. Advice on the use of alcohol is generally sound, but it is difficult to grasp the reason why " the consumption of a small amount of alcohol at the end of the day's work helps the average man to get through trying work better than he might otherwise " ; presumably he is stimulated in advance by the thought of what is coming. The fact that this book has reached a fourth edition is evidence that it meets a demand and as the number of non-medical Europeans visiting India is large it should continue to make a wide appeal.

H. H. S.

BUREAU OF HYGIENE AND TROPICAL DISEASES.

TROPICAL DISEASES
BULLETIN.

Vol. 28.]

1931.

[No. 11.

PLAGUE.

ESKEY (C. R.). **Chief Etiological Factors of Plague in Ecuador and the Anti plague Campaign.**—*Public Health Rep.* 1930. Sept. 5 & 12. Vol. 45. Nos. 36 & 37. pp. 2077-2115; 2162-2187. With 7 figs. on 2 plates, 1 map & 1 chart.

From this account we learn that Peru was the first country on the west coast of South America to be invaded by plague, the infection having been brought to it from India in 1903 by a ship with a cargo of jute-bags. The infection reached Ecuador, the adjoining country to the north of Peru, by sea through the port of Guayaquil; in February, 1908, a severe epizootic broke out among the rats in this town. The epizootic in Guayaquil was followed soon afterwards by human plague; there were 63 cases in February 1908 and 225 cases in March—the greatest number reported here in a single month. During the 22 years from 1908 to 1930, 7,616 cases were notified in Guayaquil, and an analysis of their distribution shows that there has been a decline in each successive period of five years, apparently attributable to an increasing immunity among the rat population.

Prior to 1916 the epidemic reached its peak in October–December, the last months of the dry season, but in later years most of the cases occurred in January–March, the first three months of the rainy season. The explanation seems to lie in the difference in susceptibility of the house-rats and outdoor rats. The former have acquired a considerable immunity to plague, whereas the outdoor rats, owing to their low *cheopsis* infestation are more susceptible. Consequently when the floods during the rainy season cause these rats to seek shelter within buildings the epizootic increases, and in its wake the epidemic.

From this port the infection spreads to the lowland towns and to the towns in the mountains by the transport of rats in the rolling stock of the Guayaquil–Quito railway. In Ecuador plague is found at altitudes of over 10,000 feet above sea-level. Guayaquil is considered to be the endemic source of plague in the country, and especially the quarter of the town which contains many wooden buildings with double floors and party-walls; these afford excellent harbourage for rats. In the mountainous districts the conditions and habits of

life of the Indians favour the spread of plague ; there is one living-room and often an adjoining room for the storage of grain. Guineapigs appear to be the favourite domesticated animal ; often 20 or more of them run free in the living-room. Their flesh is greatly relished and is the chief item of food at the *fiestas*. The close association of these animals with man is the source of many plague cases, and although the breeding of guineapigs in houses is prohibited, the law is not enforced. The "velorio," or death-wake, is an Indian custom which helps to spread plague. The relatives and friends come from long distances to the ceremony, which lasts from 2 to 5 days ; they feast, drink, and lie about the room of the deceased in a drunken stupor most of the time ; and they handle the body and clothing of the dead person. When the company return to their houses some of them may be incubating the disease and may be carrying infected fleas.

In Ecuador bubonic plague is the commonest form and axillary buboes are said to be often seen, especially in the mountainous districts [an observation which suggests to the reviewer a causal connexion with the use of guineapigs as food] ; many similar examples in the recent history of plague illustrate the danger of infecting abrasions or cuts on the hand when skinning animals for food or for the sale of their fur. Exact statistics of the type of plague are not available, but septicaemic plague is not likely to be common because of the generally low death-rate. Pneumonic plague is said to be rare. Two unusual forms of plague occur : (1) tonsillar plague, angina pestosa, and (2) "viruela pestosa," a form resembling chicken-pox or smallpox ; these forms are especially seen in the mountainous regions. The anginal form results from the habit of the Indians of killing vermin—*P. irritans* or lice—with their teeth. The cutaneous variety begins as bubonic plague and the skin eruption passes through stages which are very like those of chicken-pox. These types are more fatal than the ordinary bubonic form. The general mortality-rate is unusually low, about 37 per cent., and this figure is probably an over-estimate owing to the omission of unreported cases that recover.

In Guayaquil from 75 to 80 per cent. of the rats trapped are *R. norvegicus*, and the remaining rats are *R. rattus*. About 60 per cent. of the rodents trapped are mice. The detection of plague in the rats of this town is difficult, because they do not present the appearances that have been noted in other parts of the world to be characteristic of rat-plague.

X. cheopis is the species of flea which is chiefly concerned in the spread of plague in Ecuador, and it is the only species which transmits rat-plague. This flea is found at an altitude of over 9,000 feet, but not in sufficient numbers to maintain plague in epidemic form. The highest altitude at which *X. cheopis* plays an effective part as a plague carrier is about 8,500 feet. *R. rattus* has a higher *cheopis* index than *R. norvegicus*. *X. cheopis* is found in such scanty numbers on mice as to deprive them of power to transmit plague. Quito, a town of 100,000 inhabitants, at the terminus of the Guayaquil and Quito railway, 9,350 feet above sea-level, has never had a case of plague, for the reason that the conditions are not favourable for the reproduction of *X. cheopis* in numbers adequate to bring about a rodent epidemic.

Ceratophyllus londinensis is found on rats and mice at an altitude of over 8,000 feet, but it is not important as a plague carrier. *Leptopsylla musculi* is found on rats and mice in all the towns in the mountains, but, as elsewhere, is of no importance in the spread of plague ; it is

the commonest rodent flea at Quito, a plague-free town. In Ecuador *Rhopalosyllus cavicola* infests guineapigs and is found in great numbers in the mountainous districts, even at an elevation of 10,000 feet; large numbers can be found at Quito. This flea does not seem to bite man and is probably not an active transmitter of plague.

P. irritans abounds everywhere and is one of the pests of Ecuador. The author gives reasons for his belief that this species is the chief transmitter of plague to man in localities where no *X. cheopis* are found. [The reviewer has recently summarized the evidence bearing on the rôle of the human flea in plague, and is sceptical of its importance.* In his opinion the rarity of septicaemic cases in Ecuador still further reduces the probability that *P. irritans* possesses significance in this connexion.]

On account of financial stringency, radical measures for the prevention of plague, such as ratproofing buildings, cannot be applied, and as a substitute a poisoning campaign has been organized in Guayaquil. The author of the Report concludes that the use of poison is a safe, simple, effective and inexpensive procedure. He regards a reduction of 80 per cent. in the incidence of plague in January-March 1930, by this method, as a conservative estimate; the coincident trapping was a minor factor in producing the result. He believes that if the measures he describes are continued they may eradicate plague from Guayaquil, and in consequence bring about the disappearance of the disease in Central Ecuador; but the description of the unhygienic conditions which favour rat infestation in Guayaquil may arouse doubts in the reader's mind. Poison baits which contain either barium carbonate or arsenic are used. The most effective is believed to be a mixture of dried codfish, corn-meal and arsenic. The poison-mixtures are changed from time to time. Oil of anise is used to scent the baits and seems to attract rats, but not other animals.

The observations collected by the author are summarized in 43 tables appended to the Report.

G. F. Petrie.

MOREAU. Note sur le service médical du lazaret de Saint-Louis (Sénégal) pendant l'épidémie de peste de 1929. [**Plague in Senegal, 1929.**—*Ann. de Méd. et de Pharm. Colon.* 1930. Apr.-May-June. Vol. 28. No. 2. pp. 218-235.]

The author describes an outbreak of plague from May to October 1929. The aspects of the disease were of the usual nature. Of 289 cases treated, 122 died. There were 4 cases of pulmonary plague, all fatal. Out of the 289 attacked, 234 had been vaccinated with an anti-plague lipo-vaccine on dates shown on their cards, 32 were stated to have been vaccinated, but there were no cards to prove the statements; 23 had never been vaccinated. There were 94 deaths among those properly vaccinated. The value of serum treatment is recognized by the author, but he concludes that the value of serotherapy depends on its administration at the earliest possible moment. 200 cc. was given to adults daily.

J. H. Tull Walsh.

* MEDICAL RESEARCH COUNCIL. A System of Bacteriology in Relation to Medicine. Vol. 3. p. 184. (1929. London: H.M. Stationery Office.)

DANY (Henri). La peste dans le Sous. Historique. La vaccination et les autres procédés de lutte. [**Plague in Sous, Morocco.**]—*Rev. Méd. et Hyg. Trop.* 1931. May-June. Vol. 23. No. 3 pp. 113-126. With 1 map. [3 refs.]

This is the second paper referring to the 1929 epidemic. It deals with the topographical history of the outbreak, anti-plague vaccination and the general methods employed for checking the infection. There seem to have been two centres of origin, one in Ait Amira and another in Ait Amer-Ait Milk from which the disease spread partly due to rats and possibly in part due to man. The good effect of anti-plague vaccination is admitted, but its value for immunity is of short duration. The medical staff and assistants in plague hospitals were vaccinated with anti-plague serum plus anti-plague vaccine and no case of plague occurred among those persons. For destruction of rats the Danysz virus gave good results [*ante*, p. 381 (DANY)].

J. H. T. W.

NATTAN-LARRIER (L.) & RICHARD (L.). Les lésions histologiques de la peste pulmonaire primitive. [**Histology of Primary Pneumonic Plague.**]—*Bull. Soc. Path. Exot.* 1931. May 13. Vol. 24. No. 5. pp. 388-394. [3 refs.]

The authors state that their results differ somewhat from those described from pneumonic plague in Manchuria. The specimens they examined came from Madagascar. The lesions as observed by them are those of lobular bronchopneumonia where the alveoli filled with bacteria are mixed irregularly with catarrhal alveoli; they insist on the frequency of phagocytosis and have not found the grave lesions in the small pulmonary vessels described by other writers; nor have they seen thromboses and diffuse haemorrhages with rupture of the alveolar walls as described by SIGMORELLI, WU-LIEN-TEH and CHENZINSKI. Their own findings are discussed and compared with those of previous workers. They admit that they do not know at what period of the epidemic their specimens were collected, nor do they know how long the disease had lasted before death supervened.

J. H. T. W.

JOLTRAIN. Pestes frustes et ambulatoires. [**Aborted and Ambulatory Plague.**]—*Bull. Acad. Royale de Méd. Belgique.* 1930. Oct. 25. Ser. 5. Vol. 10. No. 9. pp. 663-677.

The author recalls the appearance of plague in the neighbourhood of Paris in 1920 after a period of freedom from the disease for nearly three centuries [this *Bulletin*, Vol. 20, p. 362 (JOLTRAIN)]. For the past ten years the author has been studying these early cases in their epidemiological, clinical and diagnostic aspects. He quotes certain cases and refers especially to abortive and ambulatory cases of bubonic plague which were relatively frequent. Similar cases occurred during following years and a certain number of infected rats were discovered. Clinically these cases present general febrile symptoms with a bubo. When this suppurates the temperature falls and the patient recovers. The diagnosis is difficult and the discovery of the bacillus often impossible. In one case mentioned *Bact. tularensis* was suspected. Serum

from the patient was sent to the Lister Institute. The report stated that agglutination with *Bact. tularensis* was negative. Cases of abortive and ambulatory plague are stated to be fairly frequent in Algeria where plague is endemic.

J. H. T. W.

LEMAIRE (G.) & BARDENAT (E.). Quelques complications rares au cours de la peste bubonique (Alger 1930). [**Rare Complications in Bubonic Plague, Algiers.**]*—Bull. Soc. Path. Exot.* 1931. Apr. 15. Vol. 24. No. 4. pp. 274-279.

These observations were made in Algiers during the year 1930. The first complication referred to is secondary pneumonia with bloody sputum in severe cases of bubonic plague. Such cases are not always fatal as is generally the case in primary pneumonic plague. Sometimes the softness of the bubo was not due to suppuration; only a grey serous fluid was obtained and on incision the bubo showed a caseous mass, grey or even black. Two cases are described in detail in which the eyes were implicated showing iritis and hypopyon. Both these patients died.

J. H. T. W.

- i. FONQUERNIE (J.). Observations sur un cas de Pestis minor. [**A Case of Pestis minor.**]*—Bull. Soc. Path. Exot.* 1931. June 10. Vol. 24. No. 6. pp. 446-448. [Municipal Bureau of Hyg., Antananarivo.]
- ii. LEGER (Marcel). A propos de la communication de Fonquernie sur des cas de Pestis minor. [**Remarks on the above.**]*—Ibid.* pp. 448-450.

i. On the 27th January, 1931, Rainijaona, aged 75, died of septicaemic plague after two days' illness. In the house in which he lived and in the three adjacent houses there had not been any case of plague since 1927. In that year Rainijaona's wife died of plague and there were four other cases in that group of houses. On January 28th, 1931, Razafindrakoto, aged 9, a servant in the house of the deceased man, was taken into the plague hospital. It was stated that he had been ill eight days. When seen on the 28th there was a large bubo in the right axilla; temperature normal. The bubo was punctured on the 29th and the fluid sent to the Pasteur Institute. *Past. pestis* was found and cultivated. The temperature remained normal except for a trifling rise of 0.6° two days after incision of the bubo.

ii. Leger considers the case reported by M. Fonquernie both interesting and important. It suggests the conservation of the virus in one area for a long period. It recalls to his mind cases of mild and aborted ambulatory plague during epidemics in Dakar during 1921, 1922 and 1923. These cases were sometimes fatal.

J. H. T. W.

RASOAMANANA (G.). Sur un cas d'angine pesteuse avec présence d'un bubon sus-claviculaire. [**Plague Angina with Bubo above the Clavicle.**]*—Bull. Soc. Path. Exot.* 1931. Feb. 11. Vol. 24. No. 2. pp. 164-166.

The author describes the case of a missionary, a native of Madagascar, who had suffered from sore throat for 48 hours. The throat was much inflamed and there was a painful gland just above the left clavicle. In

spite of treatment with anti-plague serum the patient died 12 hours after admission to hospital. Smears from the throat and fluid from the bubo showed the bacillus of Yersin. Smears taken from the body after death showed plague bacilli in the lungs and liver.

J. H. T. W.

ACCOVER (H.). Relation de quelques cas de peste observés à Beyrouth. [**Plague in Beirut.**]—*Arch. Méd. et Pharm. Milit.* 1931. Mar. Vol. 94. No. 3. pp. 470-474.

Plague is not often seen in Beirut, but from time to time sporadic cases occur confined as a rule to persons occupied in the traffic of the port. The infection seems to come from Egypt. Four cases occurring in 1923 and two in 1929 are described in detail. Of the first cases two recovered, and in 1929 one of the cases recovered.

J. H. T. W.

DURAND (Paul). Un cas de peste chronique ayant duré 17 mois. [**Chronic Plague of 17 Months Duration.**]—*Arch. Inst. Pasteur de Tunis.* 1931. Apr. Vol. 20. No. 1. pp. 77-82. [3 refs.]

The author writes that while no doubt rats are the chief reservoir and source of plague it becomes more and more evident that man and his fleas may become an agent in spreading the infection. He describes in detail a case observed in 1929 in the Rabta plague hospital. The essential fact is that a man suffering from bubonic plague contained in his body for seventeen months plague bacilli which were lethal to a guinea pig. References are given to papers bearing on this matter. [See this *Bulletin*, Vol. 24, p. 933 (NIKANOROW); p. 934 (DURAND & CONSEIL).]

J. H. T. W.

LINDBERG (K.). Deux cas de peste bubonique traités par le sérum et le mercurochrome. [**Bubonic Plague treated with Serum and Mercurochrome.**]—*Rev. Méd. et Hyg. Trop.* 1931. May-June. Vol. 23. No. 3. pp. 149-152.

During the winter of 1930 when plague was prevalent in the Bombay Presidency the author was able to keep two cases under observation. Both these cases were treated with anti-plague serum injections and each received intravenous injections of 20 cc. of a 1 per cent. solution of mercurochrome. The cases are described in detail. Both recovered, and as regards the treatment the author writes that without doubt anti-plague serum given from the beginning of the disease was of value in both cases. It is difficult to say whether the mercurochrome had any influence, one way or another, on the results in the first case, but in the second case, a very severe one, it appeared that the doses of mercurochrome did produce a marked effect. [See this *Bulletin*, Vol. 25, p. 319; and Vol. 27, p. 734 (CAIUS, KAMAT, NAIDU).]

J. H. T. W.

VINCENT (G. W.). **Four Cases of Plague treated with "Bayer 205."**—*Indian Med. Gaz.* 1931. Mar. Vol. 66. No. 3. pp. 126-127.

During a severe epidemic of plague in Maymyo (Burma), August, 1927, the author treated four cases of plague successfully with intravenous injections of "Bayer 205." The cases are described in detail. One was a Hindu lady 54 years of age, the others were boys 5, 7 and 14 years old.

J. H. T. W.

GOUBAREV (E.) & LIPATOVA (T.). Influence de certains anions et cations sur le développement des *B. pestis*. [**Influence of Certain Anions and Cations on *Past. pestis*.**]—*Rev. Microbiol., Epidémiol. et Parasit.* 1930. Vol. 9. No. 4. pp. 507–512. [5 refs.] [In Russian. French summary.] [Inst. of Microbiol & Epidemiol., Saratov.]

In these experiments on the influence of certain anions and cations on the development of *Past. pestis* a definite number of bacilli from 48-hour cultures were placed in a series of tubes containing broth diluted 1:1, with a certain concentration of the salt. The control tubes contained the same quantity of broth diluted with distilled water. The tubes were placed in an incubator at 28° C. After 48 hours a fixed quantity of bacilli was taken from each tube and sown on agar on Petri dishes. The colonies were counted after 48 hours: NaCl at a concentration of 16 parts per thousand (excluding the 0.5 in the medium) shows an inhibitive action and KCl checks growth more strongly than NaCl. NH₄Cl in concentration less than 16.6 stimulates development. BaCl favours development (1.66); but CaCl₂ and SrCl₂ (8.3) check growth. At 8.3 MnCl₂ stimulates growth as does Na₂ SO₄. CuCl₂, 1.66, and NaI, 0.83 parts, check development.

J. H. T. W.

i. GAISKY (N.). Un nouveau porteur de peste — *Ellobius talpinus* Pall. [**A New Carrier of Plague.**]—*Rev. Microbiol., Epidémiol. et Parasit.* 1931. Vol. 10. No. 1. pp. 59–61. With 1 text fig. [In Russian. French summary p. 61.]

ii. POPOW (W.). Zur Frage ueber die *B. pestis*-Lokalisation in Organen der Ziesel bei spontaner Pest. [**Localization of *Past. pestis* in Marmots.**]—*Ibid.* pp. 63–67. [5 refs.] [In Russian. German summary p. 68.]

i. During an epizootic among spermophiles in 1928 in the Urals mortality was observed of *Ellobius talpinus*. Two of these animals were examined and cultures of *Past. pestis* were obtained. Ninety per cent. of the fleas found on *Ellobius* are *Xenopsylla mycerini*. Sometimes *Cer. tesquorum*, *Ct. breviatus* and *Ct. pollex* are found; more rarely still *Neopsylla setosa*. A tick, *Rhipicephalus schulzei*, was also found.

ii. The author states that the absence of gross pathological conditions does not exclude the presence of plague. Marmots, in good health, were taken from an area in which epizootics were present. Sections of the spleen, liver, lungs and glands and cultures, on agar, were made. Of 608 marmots 25 showed the plague bacillus, especially in the spleen and liver.

J. H. T. W.

LEVINTHAL (Walter). Schwierigkeiten der Pestdiagnose bei Schiffsratten. [**Difficulties of Diagnosis of Plague in Ship's Rats.**]—*Ztschr. f. Hyg. u. Infektionskr.* 1931. May 22. Vol. 112. No. 3. pp. 433–435. [1 ref.] [Robert Koch Inst., Berlin.]

The author's difficulties are based upon the fact that the ship's rat contains *Past. pseudotuberculosis* as well as the plague bacillus and that there is no rapid and certain method for differentiating these bacilli. Both are Gram-negative, both bipolar and even culture reactions with

sugars and agglutinations reactions are not always reliable. The author does not offer any solution of the problem ; but expresses a hope that a bacterioscopic method will be found by which the plague bacillus may be quickly distinguished in the dead body of the rat. [See this *Bulletin*, Vol. 26, p. 99 (ZLATOGOROFF) ; Vol. 27, p. 739 (BEZSONOVA, KOROBKOVA).]

J. H. T. W.

RUKKE (G. V.). **Rodent Destruction.**—*Milit. Surgeon*. 1930. Nov. Vol. 67. No. 5. pp. 592-599.

Bubonic plague infected ground squirrels are found throughout a great area of California. The infection is spreading and the possibility of spread to other susceptible animals and to other states is not a remote possibility. All prospective military movements should be preceded by an intensive survey and campaign against rodents including the ground squirrel. This campaign should be a sufficient time in advance so that the infected fleas left after the death of the hosts shall have disappeared. [See this *Bulletin*, Vol. 26, p. 634 (GESSNER).]

J. H. T. W.

GIRARD (G.). Immunité du Hérisson et du Tanrec à la peste expérimentale. [**Immunity of Hedgehog and Tenrec to Plague.**]—*C.R. Soc. Biol.* 1931. Apr. 24. Vol. 106. No. 12. pp. 1078-1080. [Pasteur Inst., Antananarivo.]

The author describes laboratory experiments on two Insectivores of Madagascar: a hedgehog, *Ericulus setosus* and the tenrec, *Centetes ecaudatus*. These animals do not naturally suffer from plague and were found entirely immune to inoculations with plague bacilli.

J. H. T. W.

FARMAKIDIS (C.). Quelques observations cliniques sur la peste.—*Rev. Prat. Malad. des Pays Chauds*. 1930. Oct. Year 9. Vol. 10. No. 10. pp. 475-477.

GEBEILI (E.). Quelques considérations sur la prophylaxis de la peste et la marche de la légère épidémie de 1929 à Alexandre.—*Rev. Prat. Malad. des Pays Chauds*. 1930. Oct. Year 9. Vol. 10. No. 10. pp. 482-486 ; 493-498.

KALINA (G. P.). "Aljau-Met" ("Allgemeines Elend") und Pest an Murmeltieren (Marmota bobak) in Südkirgisien.—*Rev. Microbiol., Epidémiol. et Parasit.* 1930. Vol. 9. No. 4. pp. 549-552. [In Russian. German summary.]

MORRISON (A.). Sur la localisation des ganglions cruraux dans la peste.—*Rev. Prat. Malad. des Pays Chauds*. 1930. Oct. Year 9. Vol. 10. No. 10. pp. 478-481.

CHOLERA.

GILL (C. A.) & LAL (R. B.). **The Epidemiology of Cholera, with Special Reference to Transmission. A Preliminary Report.**—*Indian Jl. Med. Res.* 1931. Apr. Vol. 18. No. 4. pp. 1255–1297. With 3 charts & 1 map in text. [17 refs.]

In this preliminary report an opinion based on epidemiological evidence is presented, which would incriminate the housefly as an important transmitting agent of cholera. The main fact emerging from the experimental evidence is that isolation of a vibrio with the morphological characters of the cholera vibrio, giving a cholera red reaction, and agglutinating with cholera serum, was effected from flies 4 or 5 days after feeding on cholera vibrio suspensions. This isolation followed on negative results of culture between the second and fourth day after feeding. A suggestion is, consequently, put forward that the vibrio may undergo development in the body of the fly. It is only advanced tentatively as the evidence pointing to the accuracy of the hypothesis is recognized by the authors to be meagre and to require further investigation.

W. F. Harvey.

D'HERELLE (F.). **Studies upon Asiatic Cholera.**—*Yale Jl. of Biol. & Med.* 1929. Mar. Vol. 1. No. 4. pp. 195–219. With 6 charts.

The introductory remarks contain a sound criticism of some purely laboratory work; very rarely have these studies been made with fresh material at the bedside of the patient. Much of this laboratory work is done with old cultures from vibrios long separated from their natural environment. "And what shall we say of the results obtained by those who have undertaken to study the pathogenesis of cholera by animal inoculations, by attempting to infest with old strains of the vibrio guineapigs and rabbits, animals which are completely refractory?"

The rest of the paper recapitulates the work done in India by d'Herelle, MALONE and LAHIRI, at the request of the Indian Government in 1927. [This *Bulletin*, Vol. 26, p. 86 (d'Herelle); Vol. 27, p. 602 and pp. 1026–1027 (d'Herelle, MALONE, LAHIRI).]

J. H. Tull Walsh.

i. WU LIEN-TEH. **Preliminary Report upon Cholera Investigations in Shanghai, Summer 1930.**—*Publications National Quarantine Service, Republic of China.* 1931. Feb. 10. Ser. I. pp. 1–57. With 1 diagram. [Refs. in footnotes.]

ii. GAUTIER (R.). **Epidemiological Study of Cholera in Shanghai.**—*Malayan Med. Jl.* 1931. Mar. Vol. 6. No. 1. pp. 1–6.

i. The National Quarantine service of China was established on July 1st, 1930, and the port health work of Shanghai was taken over from the Commissioner of Customs. At the same time the fumigating vessels *Jennie* and *Jessie* passed into the hands of the Quarantine Service. With the help of Dr. C. L. PARK (Chief of the Epidemiological Division of the League of Nations (Health Section)), a new set of Quarantine Regulations was published. When an outbreak of cholera occurred, late in the summer, the authorities were ready to fight it,

with the result that only 128 cases were recorded, with 16 deaths. 537,034 anti-cholera vaccinations, done since May 15th, contributed not a little to this satisfactory result. The Chinese Hygienic Laboratory prepared one million doses for distribution in 1931. The Report contains an account of the scope and method of investigation with many tables. It also contains a Report on the Quarantine needs of Shanghai by Dr. C. L. PARK. Dr. Wu Lien-Teh's remarks on vibrios closely cholera-like which do not agglutinate are of interest :

"Some investigators not only believe that such vibrios are identical with the *V. cholera* but that they can again become agglutinable. Tempting as such an assumption is, one hesitates to accept it as it may involve belief in the indigenous origin of cholera in various parts of the world We have observed a number of instances where true cholera vibrios lost their agglutinability under our own eyes and stated our belief that the strains, found non-agglutinating from the first, may have undergone a similar involution before they reached us. In other words, there might have been a period in their history when they were agglutinable and probably virulent as well" [See TOMB & MAITRA, this *Bulletin*, Vol. 24, p. 460 ; Vol. 27, p. 14. BRAHMACHARI, Vol. 25, p. 305 ; Vol. 27, pp. 19 ; 858.]

ii. This is quite an interesting paper on cholera and the epidemiological conditions in Shanghai. The author remarks that the bacteriophage offers at the present time one of the most controversial but at the same time possibly promising fields of research in connexion with cholera.

J. H. T. W.

SHAHA (B.). **Shock in Cholera.**—*Med. Rev. of Reviews*. 1931. Jan. Vol. 6. No. 1. pp. 1-3.

The author refers to certain cases of cholera allied to what is known as *cholera sicca*. Severe cholera can occur without raising the specific gravity of the blood. It causes therefore a state of shock. This condition can only be made out by routine blood specific gravity tabling before giving saline injections. Intravenous saline injections cannot be freely used in such cases for fear of pulmonary oedema. Normal saline by the subcutaneous method and hypotonic saline by rectal injection are useful with general treatment for shock.

J. H. T. W.

ASHESHOV (Ignor N.), KHAN (Saranjam) & LAHIRI (M. N.). **The Treatment of Cholera with Bacteriophage.**—*Indian Med. Gaz.* 1931. Apr. Vol. 66. No. 4. pp. 179-184. [Bacteriophage Enquiry, Indian Research Fund Assoc., Bankipore, B. & O.]

That this treatment has roused the enthusiasm of the authors to a high pitch is evident and may be illustrated by their own statements that : "We could hardly believe our own results The mortality from cholera . . . was reduced almost to nil. . . . And when we say cholera we mean by it a severe attack of virulent true epidemic Asiatic cholera." The statistical evidence is of mortality in the same cholera ward before treatment was begun, which was 4 deaths out of 16 cases bacteriologically proved (25 per cent.), compared with 4 deaths out of 140 bacteriologically proved (2.8 per cent.) after the cases were

taken over for treatment. The patients treated had fully developed cholera symptoms, and were already in a collapsed condition or fell into collapse within six hours of admission. Treatment consisted in the use of intravenous salt solution and the administration of bacteriophage.

The strength of the hypertonic salt solution was 120 grains of sodium chloride to the pint of distilled water and of the isotonic solution 60 grains to the pint. Sterilization of these solutions, after filtration, was done under pressure in the autoclave (30 mins. at 120° C.) and not by boiling, as the boiling drives off dissolved air and renders the solution less efficacious for intravenous injection. An alkaline solution is prepared by the addition, just before use, of a powder of 160 grains of sterilized sodium bicarbonate to 1 pint of sterile isotonic salt solution. It is essential always to take the specific gravity of the blood before intravenous administration. If this is "below 1058 the patient usually does not yet require an intravenous saline." Administration of 1/250 grain of strophanthin is very beneficial. The salt solution should be administered slowly and a rate of an ounce a minute should rarely be exceeded. At a first sitting in adults it was usual to give 3 pints of the hypertonic salt solution and finish off with an additional pint of alkaline salt solution.

The important treatment with bacteriophage is very simple. It is given undiluted in about drachm doses every 30 minutes and two bottles each containing 50 cc. will be finished by direct sipping from the bottle, in the first 16 hours. After the first 24 hours, one bottle in the next 48 hours will generally suffice. Bacteriophage may also be given intravenously in 5 cc. doses for more rapid action, but it must be greatly diluted and is best administered with the salt solution. One word of warning is given regarding the bacteriophage. It should be of the highest virulence possible and have a very wide range of action.

W. F. Harvey.

METZ (M.). *Traitement du choléra.* [**Treatment of Cholera.**]*—Rev. Méd. de France et des Colonies.* 1930. Aug. Vol. 7. No. 8. pp. 352-359.

The author is the medical officer in charge of the Pnom-Penh hospital, Cambodia, and this paper refers to the results produced by two special methods of treatment: The first of these consists of injections of novarsenobenzol and sulfarsanol in moderate doses. The actual doses given are not recorded but the author maintains that these products sterilize and influence the toxæmia; and notes that 0.06 cc. of sulfarsanol dissolved in 1.0 cc. of water prevents coagulation in 100.0 cc. of normal blood. The second method employed was the transfusion of blood from patients convalescent after cholera, called the serum method. In 1927 forty-six cases of cholera were treated in the Pnom-Penh prison; 27 by what the author calls—without details—the "ancient method," 3 recovered and 24 died; 19 were treated by the "chemical method," and of these 17 recovered, 2 died. From September, 1927, to September, 1928, sixty-four serious cases of cholera were treated in the Pnom-Penh hospital: 17 by the "ancient method" with 2 recoveries; 30 by the "chemical method" with 17 recoveries; 15 by the "serum method" with 7 recoveries and 2 by the "mixed method" with 1 recovery.

J. H. T. W.

DHAR (D. R.). **Action of Kaolin on *Vibrio Cholerae* and Some Toxins.**—*Calcutta Med. Jl.* 1930. Nov. Vol. 25. No. 5. pp. 207-214. With 3 charts in text. [3 refs.]

In a previous communication it was shown that the adsorption rate by kaolin was much more rapid in the case of *Vibrio cholerae* than with an emulsion of equal strength of coli and typhoid; and quick adsorption is one of the reasons why kaolin in massive doses is beneficial in the treatment of cholera. [This *Bulletin*, Vol. 26, p. 87 (Dhar & Sen).] To find out the nature of cultural characteristics and the behaviour in growths of living cholera, vibrio experiments were carried out. Colonies on agar tubes, containing different proportions of kaolin, were counted; but no clear mathematical data evolved. But it was very definitely established that very heavy proportions of kaolin had a hampering effect on the growth of *V. cholerae*. The chemical nature of kaolin is such that only physical action is possible. The nature of this action is in keeping with the facts noticed with colloid substances.

J. H. T. W.

SEN (Atindra Nath). **Atropine in Cholera.**—*Indian Med. Gaz.* 1931. July. Vol. 66. No. 7. pp. 390-391.

The use of atropine in cholera was suggested by LAUDER BRUNTON in 1894 and first tried by Sir LEONARD ROGERS, who recommended its use from the earliest stages of the disease. Dr. Sen discusses the action of the drug and the kind of cases in which it is of value.

J. H. T. W.

MINERVIN (S. M.). Ueber Veränderungen des Choleravibrio bei Passage durch den immunen Organismus. [**Changes of the Cholera Vibrio with Passage through an Immunized Animal.**]—*Ztschr. f. Hyg. u. Infektionskr.* 1931. Mar. 18. Vol. 112. No. 2. pp. 242-245. [6 refs.] [Microbiol. Inst., People's Commissariat for Public Health, Moscow.]

Various observations have shown that in persons who have recovered from cholera non-agglutinable vibrios appear in the stools and that during epidemics of cholera the so-called cholera-like vibrios are found in greater numbers than usual. These observations have inspired the work of the author, who injected true cholera vibrios into the testicles of immunized rabbits. For the most part the inoculations of the testicles, excised 3 to 10 days later, into media were sterile. In two cases, however, one of 4 days' interval, the other of 10 days', colonies were obtained on agar. The organisms obtained from these colonies showed marked differences from the original strains, such as, almost imperceptible growth, slimy colony formation, flocculent suspension, non-motility, morphological change, inagglutinability with cholera serum, want of formation of surface pellicle, loss of virulence, etc. A restoration to the true cholera type was obtained in course of time by subculturing. The changes are interpreted as a transformation of the true cholera vibrio to the cholera-like vibrio.

W. F. Harvey.

YASUDA (Saburoji). [**Immunological Study of Cholera Vibrio killed by Chloroform Vapour.**]—*Sei-i-Kwai Med. Jl.* 1930. July. Vol. 49. No. 7. [In Japanese. English summary p. 7.] [Tokyo Jikeikwai Med. School, Tokyo.]

The comparison made is between cholera vibrios killed by chloroform vapour and by heating for one hour at 60° C. In the case of chloroform-killed vibrios antibodies are more quickly produced and so protection against infection more quickly attained. Heated vibrios are slightly more toxic than chloroform-killed vibrios. The antigenic properties of a suspension when it is kept in an ice chest are retained for at least a month.

W. F. Harvey.

- i. SHOUSHA (A. T.). La réaction d'agglutination de groupe dans le choléra. [**Group Reaction of Agglutination in Cholera.**]—*Bull. Office Internat. d' Hyg. Publique.* 1931. June. Vol. 23. No. 6. pp. 1022-1037. [16 refs.]
- ii. BUCHANAN (George S.). La bactériologie du vibron cholérique dans ses rapports avec les questions administratives. [**The Bacteriology of Cholera from an Administrative Point of View.**]—*Ibid.* pp. 1038-1041.
- iii. CUMMING (Hugh S.). Rapports entre les vibrios non-agglutinables et les vibrios cholériques. [**Relation of Non-Agglutinable Vibrios to the Cholera Vibrio.**]—*Ibid.* pp. 1042-1045.
- iv. GRAHAM (J. D.) [Documents communicated by]. Distribution géographique et répartition par mois du choléra dans l'Inde Britannique de 1919 à 1928. [**Geographical and Seasonal Distribution of Cholera in British India from 1919 to 1928.**]—*Ibid.* p. 1046. With 1 chart & 1 folding map.

i. Two vibrios, Nos. 20 and 67, were isolated at the quarantine laboratory of Tor, one from a normal pilgrim, the other from a pilgrim with dysentery. Each of these strains agglutinated in high degree with the laboratory anti-cholera serum. It was found, however, in the Public Health laboratory of Cairo that No. 20 vibrio was not agglutinated by their anti-cholera serum, while the Tor laboratory serum agglutinated both the standard cholera vibrio of the Public Health laboratory and No. 20 vibrio. This led the author to an elaborate study of the "antigenic structure" of the abnormal Tor strains and to the conclusion that the serum which was being used at Tor contained both "major" or specific agglutinin to the true *Vibrio cholerae* and "minor" or group agglutinins to strains such as vibrios Nos. 20 & 67—in other words, that these latter vibrios were not true cholera vibrios. The importance of this judgment may best be realized from the recommendations of the author in regard to the use of diagnostic cholera agglutinating sera. These are that:—

(1) The ordinary agglutination procedure for the diagnosis of cholera should be coupled with tests in which heated suspensions (containing the specific thermostable antigen) are used;

(2) a serum should be kept for cholera diagnosis which has been obtained by immunization of an animal with heated suspensions so as to exclude group reaction;

(3) arrangements should be made for the production of a standard

cholera serum which could be used by all laboratories concerned in the diagnosis of cholera.

ii. In this note there are put forward many of the points on which decisions are required. In the matter of diagnostic agglutination tests it is essential to come to a conclusion what are the differences which can exist between vibrios isolated from different acute cases and in different epidemics. The thermostable antigen is probably the best index of the potential pathogenicity of a suspected vibrio.

The existence of healthy carriers is still a matter of controversy and therefore of great administrative difficulty. Air-travel brings its own special problems to the authorities. Anti-cholera vaccine is of little value for the elimination of carriers and is therefore chiefly useful for the protection of an individual who is rapidly transported to a country in which cholera is rife. Protection of the traveller is, of course, also a means of protection for the general population.

iii. A number of papers are referred to under this heading and the general deduction is that there is little positive proof of the relationship of the two types of vibrio.

iv. These communications consisted (1) of a map of India giving the mean mortality from cholera for its several provinces and districts during the 10 years 1919-1928 and (2) of a very useful diagrammatic figure showing mean cholera mortality month by month in the various provinces during the same period.

W. F. Harvey.

FINKELSTEIN (M. H.). **Problems in the Bacteriology of Cholera and Cholera-like Infections.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1931. June 30. Vol. 25. No. 1. pp. 29-38. [32 refs.] [Bact. Dept., Univ., Edinburgh.]

In this lecture the author deals with some of the outstanding problems of cholera and its causative vibrio. The clinical manifestations which are to be included as true cholera, the relationship of the paracholera and water vibrios to the *Vibrio cholerae*, the variability and serological types of *V. cholerae*, the existence of true carriers in the same sense as for typhoid and the use of bacteriophage in cholera all receive consideration.

W. F. Harvey.

SCHÜTZ (Franz). Ueber den Stickstoffverbrauch der Choleravibrionen zum Aufbau ihrer Leibessubstanz (plastische Quote). [**Nitrogen Requirements (Plastic Quota) of the Cholera Vibrio.**—*Ztschr. f. Hyg. u. Infektionskr.* 1931. Mar. 18. Vol. 112. No. 2. pp. 287-297. [13 refs.] [Hyg. Inst., Univ., Berlin.]

Nutritive materials may be said to serve two purposes in the life both of higher organisms and lowly bacteria, those connected with the output of energy and those concerned with growth and reproduction. These may be called the dynamogenic quota and the plastic quota of metabolism respectively. It is the utilization of nitrogen for the plastic quota which is here investigated with the following results:—

The media used were fluid and contained 0.03, 0.06 and 0.1 per cent. nitrogen. They also contained 0.5 per cent. glucose. Growth was continued for 1 to 4 days and the cultures then centrifuged. It was found that the centrifuged deposit from 100 cc. of culture furnished

1.99 to 0.25 mgm. nitrogen, which corresponded to a utilization of 4.09 to 0.62 per cent. of the nitrogen of the nutrient medium. No evidence was found that the nitrogen content of the medium exerted any influence upon the quantity of the nitrogen in the deposit. The same negative result was obtained when the nitrogen content for a given number of vibrios was correlated to the nitrogen content of the medium.

W. F. Harvey.

LULL (G. F.). **Cholera and Prophylactic Vaccination in the Philippines.**—*Milit. Surgeon*. 1931. May. Vol. 68. No. 5. pp. 645-648.

The author wisely states that "conclusions as to the protective power of cholera vaccine cannot be drawn without careful controls" but considers that the results of the epidemic studied are worth reporting. His deductions are that at least two doses of cholera vaccine should be given and that vaccination modifies the course of infection.

W. F. Harvey.

RAJU (V. Govinda) & SARKAR (Abhay Kumar). **The Results of Prophylactic Cholera Inoculation in Faridpur District.**—*Indian Med. Gaz.* 1931. Mar. Vol. 66. No. 3. pp. 135-137.

These results have special reference to the use of a single prophylactic dose of cholera vaccine and are based for their estimates of the number of non-inoculated at risk on the recorded population of a district in which a severe epidemic of cholera had broken out. Inoculation was started at the beginning of the epidemic. The case-incidence figures by this mode of computation are 3.3 per mille of 52,295 inoculated and 16 per mille of 203,956 uninoculated. Details are given for individual villages.

W. F. Harvey.

HASSELMANN (C. M.). Bericht ueber gegenwärtige Choleraepidemie auf den Philippinen und die Möglichkeit einer Weiterverbreitung in andere Häfen. [**Cholera in the Philippines and the Possibility of its Spread to Other Ports.**]—*Deut. Med. Woch.* 1931. Jan. 16. Vol. 57. No. 3. pp. 109-111.

The author describes outbreaks of cholera from 1925 to the present time and discusses the possibility of the disease spreading to other ports and lands.

J. H. T. W.

TOMB (J. Walker) & MAITRA (G. C.). **Report on an Investigation on Cholera in the Asansol Mining Settlement, Bengal, India.**—*Jl. Trop. Med. & Hyg.* 1931. Feb. 16. Vol. 34. No. 4. pp. 49-55. [10 refs.]

This paper refers to work done and observations made during the years 1925 to 1928. The material used has already appeared in other publications [this *Bulletin*, Vol. 24, pp. 460-461 and Vol. 27, p. 14].

J. H. T. W.

HEAT STROKE.

CAZAMIAN (Pierre). Coup de chaleur et "crampes" des chauffeurs (étude clinique, pathogénique, prophylaxie, traitement). [**Heat Stroke and Fireman's Cramp.**]—*Arch. Méd. et Pharm. Nav.* 1928. Apr.-May-June. Vol. 118. No. 2. pp. 102-115.

Dr. Cazamian is a naval surgeon and this paper is a careful study of heat stroke as it occurs in steam ships including heat exhaustion and "cramps." He considers the clinical aspect, pathogeny, prevention and treatment of heat stroke generally and points out that "cramps" occur most frequently in the muscles of the extremities, then in the abdomen and quotes the view of Cl. BERNARD and VALLIN that coagulation of myosin takes place in the affected muscles. Many other workers are referred to. In serious forms of cramp he recommends injections of ether, caffeine, oil of camphor and intravenous injections of glucose 47/1,000. Bleeding may be necessary when there is auto-intoxication, morphine, warm baths at 30° C., atropine and similar drugs. The patients should drink plenty of fluid not too cold. [See this *Bulletin*, Vol. 23, p. 457 (*U.S. Nav. Med. Bull.*).]

J. H. Tull Walsh.

HAMILTON (C. S. P.), BASU (D. N.) & VAN HAEFTEN (J.). **Review of Cases of "Effects of Heat" (Heat-Stroke, Anidrosis and Heat Exhaustion) occurring during the Hot Weather of 1929 at Allahabad.**—*Jl. Roy. Army Med. Corps.* 1930. Aug. Vol. 55. No. 2. pp. 120-125. With 1 text fig.

The authors describe twenty cases of heat stroke which occurred among the troops in Allahabad in 1929. They were mild cases and no deaths occurred. For sixteen days before the first case, the maximum temperature had ranged from 105° to 113° F., whereas the minimum was never below 84° F. The lowest wet bulb reached 66° F. for one day and averaged 75° F.; whereas the dry bulb reading had never been below 90° F.

J. H. T. W.

SPERO (L. P.). **A Fatal Case of Heat-Stroke.**—*Jl. Roy. Nav. Med. Serv.* 1929. Jan. Vol. 15. No. 1. pp. 53-54.

On September 15, 1928, H.M.S. *Dahlia*, on patrol at the southern end of the Red Sea, received a wireless message from the tug *St. Just*:—"Very urgent; man been unconscious with heat stroke for two hours." An hour and a half later the tug was sighted. The patient, a fireman, aged 54, was lying in his hammock in convulsions. The history given was that a few days previously the man was excused duty as he found his duties in the boiler room very trying. Feeling better he returned to work. He suffered from headache in the forenoon of the 15th and later collapsed, the boiler room temperature being 140° F. Another tug had lost a man from heat stroke a few days previously. The patient was transferred to the *Dahlia* which proceeded to Aden. The man was in convulsions, with periods of coma; rapid, shallow respirations; pupils contracted; temperature 109° F.; pulse 100. Rectal injections of iced water, iced sheets and a rectal injection of chloral hydrate and pot. bromide reduced the temperature to 104° F. and the convulsions ceased. In the night the temperature rose to 107° F. Saline was injected subcutaneously under each breast four times and seemed beneficial for later he showed signs of returning

consciousness and was able to suck pieces of lint soaked in glucose and bicarbonate of soda solution. In the early morning he developed a distinct smell of acetone in his breath, with Cheyne-Stokes breathing; temperature not above 105° F. At Aden the patient was transferred to the European Hospital. He died a few hours later.

J. H. T. W.

FOY (H. Andrew). **A Note on Recurrent Attacks of Heat-Stroke and Sun Traumatism in the Same Individual.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1930. Nov. 25. Vol. 24. No. 3. pp. 353-354.

The authors describe a case of two major and two minor attacks of heat stroke in the same individual. In such a patient it would appear that some predisposing constitutional condition such as an acid metabolic excess renders him susceptible to the effects of the sun's rays. The man was living in Nigeria and the first major attack occurred at 35 years of age, the second at 46, when the symptoms were more serious. The man came to England in June 1920 and was admitted to the Hospital for Tropical Diseases, London. Recovery was slow, but five months later the patient returned to Nigeria.

J. H. T. W.

TAKEUCHI (Yoshio). Ueber den Blutbefund bei Hitzschlag und Sonnenstich. [**The Blood in Heat Stroke and Sun Stroke.**—*Jl. Oriental Med.* 1929. Nov. Vol. 11. No. 5. [In Japanese. German summary p. 148.] [Faculty of Imperial Kyushi Univ., Fukuoka, Japan.]

The author has discussed the blood condition in sun stroke and heat stroke as found by other workers. As the outcome of the results of his own experiments he finds that there are considerable changes in the blood both in sun stroke and heat stroke; they correspond to and follow the rise of temperature and general symptoms. As a rule there is not much loss in erythrocytes or haemoglobin; but such loss does occur in serious cases. Frequently there is leucopenia. Generally the "pseudoeosinophile" leucocytes and the large monocytes increase while, in contrast, the eosinophile leucocytes and the lymphocytes diminish. After the experiments the blood returns to normal by degrees.

J. H. T. W.

RENNIE (D. C.). **Notes on the Cold (Anti-Heat Stroke) Ward at Masjid-i-Suleiman, South Persia.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1930. Apr. 17. Vol. 23. No. 6. pp. 645-648.

The author describes a special "anti-heat" ward in the Persian Oil Company's hospital, at Masjid-i-Suleiman, built and ready for use in 1927. The refrigerating plant is a single horizontal ammonia compressor working in conjunction with the brine circulating system. The ward and air lock entrance are well insulated. The building is artificially lighted and there are no windows. No case has gone on to heat stroke since the ward was opened; operations, accidents, burns, etc., have been treated with success and saving of time and the ward has given a sense of security to the staff. Patients are gradually withdrawn from

the ward after recovery. No case of bad effects has occurred from return to the surrounding high temperature. The cost amounts to between £400 and £500 per annum.

J. H. T. W.

MARSH (Frank). **The Etiology of Heat-Stroke and Sun Traumatism.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1930. Nov. 25. Vol. 24. No. 3. pp. 257–276. With 5 figs. [23 refs.]

This paper deals with a series of experiments carried out at Abadan in S. Persia during the summer of 1929, the object being to discover some of the factors involved in the causation of sunstroke and sun traumatism. The shaven heads of a number of albino and black rabbits were exposed to the direct rays of the sun. The bodies of some of the animals were artificially cooled by wetting and a blast of cool air, while the fur of other animals was kept dry and no artificial cooling employed. Almost without exception the animals in which the body temperature was kept from rising by the cooling measures adopted were able to withstand the effects of the sun. On the other hand, the vast majority of the dry, un-cooled rabbits succumbed to heat stroke. The black rabbits were found to be more susceptible to heat stroke than the albinos. The conclusion is drawn that the heat rays, and not the ultra-violet rays of the solar spectrum are responsible for the production of heat stroke which develops when the general body temperature rises to critical heights. It is contended that "sunstroke," "heat-stroke," "heat exhaustion," "insulation" and "sun traumatism" are all conditions of "hyperpyrexia due to heat."

A plan and description is given of the heat-stroke ward in the hospital of the Anglo Persian Oil Company at Masjid-i-Suliman, and the treatment of patients is briefly dealt with.

An interesting discussion on the paper is given in which the following questions were dealt with: clothing worn in the tropics; the geographical distribution of heat-stroke; sweating; and the increased danger of hyperthermia occasioned by heavy muscular work and fatigue.

G. P. Crowden.

MARTIN (Charles J.). **Thermal Adjustment of Man and Animals to External Conditions.**—*Lancet.* 1930. Sept. 13, 20 & 27. pp. 561–567; 617–620; 673–678. With 17 text figs. [99 refs.] [Summary appears also in *Bulletin of Hygiene.*]

In this series of three Croonian Lectures to the Royal College of Surgeons Sir Charles Martin deals with the mechanism of temperature regulation in man particularly under conditions met with in warm climates. He emphasizes the importance to man of this power of adaption to environment. "By establishing a temperature around 40° C. which, from the materials of which animals are constructed, provides the maximum activity attainable, the homoeothermic animal achieved an immense advantage over its poikilothermic contemporaries." The mechanism for maintaining this relatively constant condition depends for its efficiency on automatic control both of heat production and of heat loss by the body, aided by an intelligent use of "adjustable insulation," which enables man to withstand greater extremes of external temperature than would otherwise be possible. The temperature of the surroundings, the moisture in the air and air movement determine

the heat lost by the body by radiation, convection and evaporation. A comfortably clothed individual sitting in a room at 15° C. and 50 per cent. relative humidity loses 44 per cent. of excess heat by radiation, 31 per cent. by convection and 20 per cent. by evaporation of moisture from lungs and skin, but in hot surroundings evaporation of sweat may be the only mechanism for heat loss. A resting man produces some 1·2 large calories of heat per minute which if lost by evaporation of moisture would mean a loss to the body of at least 2 cc. water per minute (1 gram of water evaporated absorbs 585 small calories). Strenuous work would necessitate the evaporating of approximately a pint of moisture per hour, and there must be a corresponding intake of water by the individual. Sir Charles states that he had great difficulty in impressing these physiological facts on the military authorities during some of the desert campaigning in the summer of 1916.

The nervous mechanism of thermotaxis and the nervous control of the vessels in the skin and of the sweat glands is described. The evidence of the existence of a central co-ordinating mechanism is examined and the development of thermal adjustment is dealt with from the view point of comparative physiology. The source of animal heat and the rate of heat production as influenced by such factors as food and exposure to cold are studied, and Sir Charles recounts some interesting experiments on himself carried out during a voyage through the tropics, which showed that adaptation to hot climates is partly achieved by a lowering of the basal metabolism by some 12 per cent. The part played by the internal secretion of the thyroid and suprarenals in thermal regulation is also discussed.

In the third lecture, temperature regulation in a warm environment is fully dealt with. The experimental evidence points to the fact that central thermal stimulation, by a rise in temperature of the blood supplied to the brain is more effective than local warmth in producing sweating. The naked body exposed to sunshine may absorb 3,420 calories per minute, or three times its resting heat production. This heat is equivalent to the extra heat which a man would produce when walking at a rate of three and a half miles per hour on the flat.

Finally, the author deals with the important question of work at high external temperatures. He describes some experiments on the bicycle ergometer in which he found that the maximum wet bulb temperature which he could endure, without continuous rise in body temperature while working, was 87° F. In a climate with shade temperatures approximating to those of the skin, a man performing hard manual work would need to evaporate from his skin a litre of sweat per hour to maintain his temperature balance. This is impossible unless such clothes as are worn are very thin and wet. Otherwise the evaporation of sweat takes place too far from the body surface, and its cooling effect diminished. The author therefore concludes that the obstacle to work in hot climates for the European is his conventional clothing. A valuable bibliography is given.

G. P. Crowden.

SLEEPING SICKNESS.

CARPENTER (G. D. Hale). **Report on Sleeping Sickness from January to September, 1929.**—*Uganda Protectorate Ann. Med. & San. Rep. for Year ended 31st December, 1929.* Appendix I. pp. 53–57.

LEE (S. W. T.). **Report on Sleeping Sickness from September to December, 1929.**—*Ibid.* pp. 58–59.

As Carpenter went on leave towards the end of 1929, he decided to limit his report to the first nine months of the year, leaving the last quarter to his deputy, Dr. Lee.

After giving an account of his own activities, the staff available and the introduction of new legislation, Carpenter summarizes the present state of affairs in each sleeping sickness area.

Victoria Nyanza—Nile area. No new cases have been reported in this area, except in the old endemic area of Samia County at Mjanji; it therefore seems probable that the outbreak at Kyadondo has been suppressed. Inspections of the Lake area made during the year show that there is a very real risk that infection once introduced into the islands would find an opportunity for spreading. In many places there are small settlements of a few families living where they are surrounded by *G. palpalis*, and where they can only get water by traversing fly-infested roads. These settlements are quite unable to protect themselves by prophylactic clearings and yet are too small to be worth the expenditure of money in paid labour. Recommendations made in the past that such small settlements should not be allowed have not met with the approval of the Administration. The author considers that very close administrative supervision of the conditions under which the people live is essential if sleeping sickness is to be prevented from establishing itself on the islands and mainland coast.

Busitema and Mpologoma areas. These have not been toured; in both sleeping sickness is in abeyance.

Siroko Valley area. The population was examined by Carpenter and no new cases of sleeping sickness were found.

Lake Edward-George area. Only the Kigezi portion of the area was toured; no new cases were found.

Bwamba Valley area. This was not examined.

Wasa River area. Constant trespass into this "restricted area" was found to be taking place by natives hunting illegally.

Buganda-Lake Albert area. In the absence of medical supervision it has not been possible to proceed with the establishment of the fishing village at the south end of Lake Albert as arranged last year.

Bunyoro area. Carpenter visited the Murchison Falls and made recommendations as to clearing necessary to safeguard visitors to the falls.

Gulu area. (a) *Acholi.* The recommendations made by Dr. FREETH had been carried out and the situation was immensely improved. The whole population of the fly-infested area was examined and only 2 new cases found among 26,535 persons examined. During 1928, Dr. FREETH had discovered 116 new cases, but up to August of 1929, only 27 new cases had been reported.

(b) *Madi.* Capt. FREEMAN before he left Madi examined the population and reported in East Madi 11 new cases among 3,106 persons examined and in West Madi 6 new cases out of 10,400 examined. There seems to be evidence that sleeping sickness may again be increasing in Madi.

Chua area. There has been no medical officer at Kitgum during the year. In November, 1928, sixteen cases had been reported at Paranga. Carpenter, who visited the place in April, 1929, found that very extensive clearings had been carried out; 3 new cases and 2 suspects were found among 1,519 persons examined.

West Nile area. The report in this area is disquieting; the epidemic continues to spread. The total number of cases found between the middle of 1928 and September, 1929, is: Aringa 1,167, Junam 539, Madi Ai-avu and Midiri 96, Omugo 38, Kobokko 8, Arua township 7, Terego 1. A disquieting fact is the case found at Terego, a county from which no cases have hitherto been reported; others will probably be found.

Carpenter's report closes with some remarks on recruitment of labour.

ii. Lee carried out a tour of the Eastern Province sleeping sickness area during November and December. The outbreak in the West Nile area showed signs of abating. In the Gulu area there was an increase in the number of deaths in the Madi district; this increase is significant in view of the fact that for the greater part of the year no medical officer was available for duty in either Madi or Gulu.

Nine cases of sleeping sickness were treated at Kitgum in the Chua area in 1928, but during 1929 the number rose to 39 proved cases and 20 suspects.

The remaining areas in Uganda have produced no increase in the number of sleeping sickness cases. Clearings are reported to have been adequately maintained and the position appears to be satisfactory.

W. Yorke.

PRATTI. Note sur la palpation et ponction des ganglions cervicaux dans la pratique itinerante. [**Palpation and Puncture of Cervical Glands in Itinerant Practice.**]*—Ann. Soc. Belge de Méd. Trop.* 1931. Mar. 31. Vol. 11. No. 1. pp. 75-90.

The author lays particular stress on the fact that his observations in this paper apply to work in the field and not to hospital or laboratory work. The engorged cervical glands, which serve as a guide in the diagnosis of trypanosomiasis vary in site, size, form, consistency and number.

Position. The enlarged glands may be unilateral or bilateral; there may be isolated enlarged glands or groups of glands. Similarly, sometimes the superior glands are involved and at other times the inferior glands. The author draws attention to many other conditions than trypanosomiasis which may give rise to enlarged cervical glands and points out that one of these may co-exist with trypanosomiasis.

Size. A gland, which in the normal state is not palpable, may in trypanosomiasis enlarge to the size of a pigeon's egg. The author distinguishes the following gradations. i. Pin-head. ii. Small. iii. Moderately small. iv. Moderate. v. Large.

Whilst the superficial glands are easy to palpate, the deep glands are more difficult and require experience. The fact that glands escape notice on palpation and are difficult to puncture is not due to their small size, but to the fact that they are deeply placed beneath the muscles.

A good palpation involves three procedures: (a) Deep palpation. (b) Superficial palpation. (c) Palpation à plat in which the palmar

surface of the hand is passed over the surface of the neck ; enlarged glands, which otherwise may escape notice, are detected by the radial side of the index finger.

Form. This is generally ovoid, but sometimes round and sometimes elongated. The contours are always regular and rounded, and the glands are not adherent to the skin or tissues, so that they roll easily under the fingers.

Consistency. The typical glands are of the consistency of a ripe plum. Although, however, this is characteristic of trypanosomiasis, it must not be forgotten that there are other affections which may give rise to the same phenomenon. If, on the one side, this condition is not exclusive to sleeping sickness, there are glands of other kinds which are positive on puncture.

During the evolution of the disease the glands hypertrophy and then, having reached their maximum, they progressively diminish in size and in elasticity and lose their characteristic appearance. On palpation of a chain of glands it is possible sometimes to appreciate quite easily glands in different stages of evolution and involution. In patients in the sleeping sickness stage glands are often to be found which exhibit a remarkable degree of sclerosis and, however, may be positive on puncture.

The author then passes to an analysis of his own observations. He contrasts the results of puncturing groups of a 100 each of individuals with large glands, moderate glands, small glands, and very small glands : 95 per cent. of the first were positive, 12 per cent. of the second, 4 per cent. of the third, and 1 per cent. of the fourth. From this he concludes that the value of gland formulae is directly proportioned to their size. It is remarked that enlarged glands are, of course, more likely to be due to sleeping sickness in heavily contaminated regions than in regions where the disease is merely sporadic. He illustrates this by observations in two localities. In the first, where the number of infected was about 12 per cent., 6,195 persons were examined. Of those with large glands, 84 per cent. were positive ; with moderate glands 40 per cent. ; with small glands 18 per cent. ; and with very small glands 11 per cent. In the second district, where the intensity of infection was only 2 per cent., 2,797 patients were examined. Of those with large glands 84 per cent. were positive ; with moderate glands 11 per cent. ; with small glands 4 per cent. and with very small glands 1 per cent. From these figures it is apparent that the large glands have the same value in each district, but the smaller glands have less significance in the sporadic region than in the epidemic region.

Further work showed that the value of the examination of the lymphatic glands is greater in adults than in children, and that this applied equally to glands of large and small size.

W. Y.

HAMERTON (A. E.). **Remarks on Trypanosomiasis in Relation to Man and Beast in Africa.**—*Jl. Roy. Army Med. Corps.* 1931. Mar. Vol. 56. No. 3. pp. 161-166. [6 refs.]

Although he has modified the opinions concerning the desirability of exterminating wild animals in " fly " country, which he held in 1913, when a member of the Royal Society's Commission on Sleeping Sickness,

the author considers that "the alleged rôle of the great African Fauna in maintaining the tsetse fly population and the incidence of human trypanosomiasis or sleeping sickness is still a debatable point." In the present article he has attempted to state very briefly the case for and against the game, and incidentally to mention some of the more important observations which have caused him to modify his former views.

There appears to be little doubt that the large ungulata have been almost exterminated in certain parts of the country and the tsetse has remained in these districts as elsewhere. Various examples are referred to in support of this statement. Hamerton writes "No man can foretell the result of depriving the tsetse of its accustomed diet of wild animals' blood" [It was for precisely this reason that many years ago the reviewer and others advocated the carrying out of a scientific experiment]; but so long as there are men and cattle about the "fly" will not starve. Evidence is accumulating in support of the view that game destruction instead of being a remedy increases the danger from the fly by causing dispersal of the insects which subsequently concentrate around villages in the bush where they feed mainly on man and inoculate into his blood certain animal-derived parasites which in the game are harmless, but become lethal when introduced into man and his domestic animals. [This may be true, but before he could accept it as a fact the reviewer would require very convincing evidence that *G. morsitans* could flourish unperturbed when its main food supply had disappeared. If so it is indeed an animal greatly to be envied. Again, if it be a fact that when in an area the game is destroyed the fly tends to concentrate round the villages in that area in order to attack man, why not devote attention to reasonable clearings round those villages? Finally, whence, in the absence of game, would the tsetse draw the "animal-derived parasite" to inoculate into man?]

After referring to evidence indicating that a trypanosome normally and harmlessly living in the blood of game animals may, under certain conditions, become adapted to living in human blood in which it develops lethal properties, Hamerton passes to a consideration of the converse process where trypanosomes pathogenic to man may after prolonged sojourn in game become non-pathogenic to man. In support of this hypothesis reference is made to the present state of affairs in the Sese Islands, to the experimental inoculation of man with game trypanosomes by TAUTE and HUBER, and to the recent experimental investigations by the reviewer and his colleagues. [This short paper is worth consulting in the original by those interested in this important subject.]

W. Y.

KLEINE (F. K.). Erfahrungen einer ärztlichen Studienreise nach Ostafrika. [**Medical Experiences in a Visit to East Africa.**—*Deut. Med. Woch.* 1931. Jan. 23. Vol. 57. No. 4. pp. 153-155. [2 refs.] [Robert Koch Inst., Berlin.]

The author spent two years in Tanganyika Territory, and continued as far as he was able his work on the trypanosome infections. At the mission at Sikonge, near Tabora, he inoculated 24 sheep with the blood of 24 sleeping sickness patients. There remained alive, after 2 months 17, after 3 months 10, after 4 months 6, after 9 months 3; two

apparently made a complete recovery. Three of the strains were subinoculated from sheep to guineapigs, the blood of which was examined every fifth day till their death and 500 trypanosomes counted. In one guineapig, which survived 75 days, posterior nuclear forms were never seen. Though it is conceivable that infected sheep might be a source of danger to man, all epidemiological studies point to man to man infection. Possibly the virulence of the trypanosome in wild or domestic animals steadily gets less; it would be a simple experiment to find out.

Turning to chemotherapy he comments on the part played by the animal host. Germanin is effective in *T. rhodesiense* infection in man, but is useless in the same infection of cattle. On the other hand, antimosan is very effective in cattle but has no action in trypanosomiasis of man. He notes the variability of the trypanosome content of the cerebrospinal fluid and quotes the case of a child previously treated with tryparsamide in whose C.S.F. there were on one occasion 750 parasites per cmm. and a week later only a single trypanosome was detected, though no fresh treatment had been given. Of various remedies which he tried none was comparable with germanin.

A. G. B.

SCHILLING (Claus). **Spontaneous and Experimental Infection.**—*Jl. Trop. Med. & Hyg.* 1930. Nov. 15. Vol. 23. No. 22. pp. 334–336. [Robert Koch Inst., Berlin.]

The author points out that among the great number of enigmata confronting the epidemiologist and parasitologist, one of the most interesting is the puzzle of the healthy carrier. Why is invasion not equivalent to infection? Why does a child carrying toxin-forming diphtheria bacilli in his throat not necessarily suffer from diphtheria? Why does a carrier of the poliomyelitis virus not develop poliomyelitis?

After referring to a number of recent observations on yellow fever and malaria bearing on this subject, the author passes to trypanosomiasis. Many observers have shown that "genuine" strains isolated from naturally infected animals have a low virulence for mice and rats, whilst old laboratory strains killed these animals within a few days. Moreover, the antigenic qualities of genuine and old laboratory strains are different. BRAUN and TEICHMANN and Claus Schilling have tried in vain to immunize with genuine trypanosomes; this can only be done with old laboratory strains. Again, the sensitiveness to the action of chemotherapeutic drugs undergoes modifications as the result of a long series of transmissions from animal to animal without interpolating the insect host.

In 1912–1924 the author and the late HANS SCHRECK carried out a number of experiments on the tsetse-free island of Makatumba near Dar-es-Salaam. They had at disposal a strain of *T. brucei* kept at Hamburg in small animals for many years (Strain Hamburg alt), and *G. morsitans* bred from pupae and therefore free from infection. The flies were fed on a rat infected with Hamburg alt, then on normal cows, likewise infected, and afterwards on a normal rat. With the new strain "Hamburg recens," passed through the fly, the following experiments were executed:—

Calf, about 3 weeks old, infected February 27th, 1914, with Hamburg recens. On March 5th and 16th very scanty trypanosomes in the blood. (Sera always heated at 45° C. for 30 minutes to kill the trypanosomes of the donor.)

(a) Serum of the day of infection, February 27th, 1914.

Mouse.		Days after							
		1	2	4	5	6	9	13	18
1.	Serum alone ...	0	0	0	—	0	0	0	0 experiment closed
2.	Serum + Hamburg alt ...	+	++	+++	dead				
3.	Hamburg alt alone ...	+	—	+++	dead				
4.	Serum + Hamburg recens ...	0	0	0	++	+++	+++	+++	dead
5.	Hamburg recens alone ...	0	0	+	+++	+++	+++	+++	dead

Trypanosomes *in vitro*. after 30 minutes trypanosomes in all tubes motile.

(b) Serum of the 36th day after infection.

Mouse.		Days after							
		1	2	3	4	5	14	23	30
1.	Serum + Hamburg alt ...	0	+	++	dead				
2.	Hamburg alt alone ...	0	0	++	+++	dead			
3.	Serum + Hamburg recens ...	0	0	0	0	0	0	0	0 experiment closed
4.	Hamburg recens alone ...	0	0	++	+++	+++	+++	dead	

Trypanosomes *in vitro* after 30 minutes contact with serum :

Hamburg recens nearly all motionless

Hamburg alt actively motile

Other experiments with the same strains showed the same phenomenon of specific action. They were compared with a genuine strain from a gnu killed in the bush. Virulence and sensitiveness to serum of the gnu strain were the same as the Hamburg recens.

Schilling claims from this work to have shown : (a) an old laboratory strain of *Trypanosoma brucei* is far different in virulence and antigenic qualities from a genuine strain ; (b) such a laboratory strain is changed in its most important qualities by one passage through the natural transmitter, i.e., the glossina ; (c) it is restored to the qualities of a genuine strain.

[This is an important piece of work and requires confirmation. It does not seem to be in harmony with DUKE's statement that arsenic resistance is transmitted through glossina. There is some evidence to be found in the literature that it is not easy to pass old laboratory strains through glossina, but Schilling apparently experienced no special difficulty.]

W. Y.

DUKE (H. Lyndhurst). *Trypanosoma gambiense* in Monkeys and Ruminants; Prolonged Infection, Immunity and Superinfection.—*Parasitology*. 1931. July. Vol. 23. No. 3. pp. 325–345. [7 refs.] [Human Trypanosomiasis Inst., Entebbe.]

The author commences by stating again certain conclusions reached in two previous papers (this *Bulletin*, Vol. 25, p. 764, and Vol. 26, p. 205). The object of the present paper is to submit further evidence on two important points—firstly, the ability of ruminants, domestic and otherwise, to serve as reservoirs of *T. gambiense*; and secondly, the effect on this species of trypanosome of prolonged sojourn in a single mammalian host. In this paper there is presented all the evidence on these two subjects now available in the Entebbe records, old and new, published and unpublished. These must be consulted in the paper by those interested.

Duke states that his experiments show a remarkable agreement in testifying to a decrease in the transmissibility of *T. gambiense* when it remains for long in one and the same animal. The infectivity of the strain to the gut of tsetse, apart from its transmissibility, also tends to diminish as the sojourn in the mammal increases. The diminution in the adaptation of a strain to tsetse may progress to complete loss of transmissibility, and when once this stage is reached it is highly improbable that transmissibility can ever be recovered. There is good reason to believe that in many cases the diminution is the effect of inhibitory influences exerted on the trypanosomes in the course of time by the tissues of its mammalian host, and that the strain once freed from these influences by introduction into another and non-immune host may recover in this new host, temporarily at all events, its original transmissibility.

The transmissibility of a strain, although greatly reduced, may persist for a long time, often up to the death of the host; thus trypanosomes in 4 sheep were still infective to fly 12 to 18 months after their original infection. We do not know whether these strains after their long stay in an individual mammal are still capable of infecting man. It is, therefore, quite clear that *T. gambiense* can persist in a transmissible form in sheep for more than a year and, indeed, until the death of the animal from some intercurrent disease or accident, for there is no evidence that infection with strains of *T. gambiense* recently isolated from man necessarily shortens the life of sheep and goats. Some sheep and goats show complete resistance to infection with *T. gambiense*; and some of the 19 strains of *T. gambiense* were much less able to survive in a transmissible form in sheep and goats than were others.

It is very probable that in addition to individual differences between different strains in their ability to utilize tsetse, individual mammalian hosts differ in their attitude towards the trypanosome, some being more congenial to it than others.

In nature revival of the transmissibility of a strain by the agency of inoculation into a new host must be an exceedingly rare event. Direct transmission is essentially dependent on the presence of numerous trypanosomes in the peripheral blood, and in the chronic infections under consideration this condition is probably never fulfilled. There is little evidence that cyclical passage through fly has the same stimulating effect on the strain as direct inoculation into a new host.

These experiments suggest that from the epidemiological point of

view the chief danger is the recently infected vertebrate host in which the trypanosome is best able to exercise to the full its powers of utilizing tsetse. Chronic cases are much less dangerous owing to the inhibition of the transmissibility of the trypanosome by prolonged contact with the tissues of one and the same host. Experience of the last few years generally confirms Conclusion 4 of the International Commission's Report, viz., that the transmissibility of *T. gambiense* is greater in the human patient than animals infected from him, whether infection be by fly-bite or by the syringe.

In three strains of polymorphic trypanosomes from natural sources other than man, transmissibility by tsetse has been lost during a period of maintenance by syringe passage of many months' duration. Other strains isolated from man have been found to be non-transmissible in subinoculated animals; and one strain obtained in a monkey inoculated from a situtunga was found to be completely non-transmissible and all but non-infective to tsetse. All this work suggests very strongly that the depression of transmissibility not uncommonly proceeds to the point where this property is permanently lost. The existence, so commonly reported by observers of sleeping sickness, of sporadic cases of human trypanosomiasis in fly-infested native populations, where the disease shows no signs of spreading, is thus easily explained, since in such cases the trypanosome cannot pass cyclically through tsetse.

Superinfection. For several reasons superinfection is important to the present discussion. First, it is an accident that must frequently befall both men and animals exposed to tsetse in nature; and secondly, by means of the transmissibility test, superinfection renders possible the recognition of a degree of immunity not appreciable by any test previously devised. An account is given of three sheep, a goat, and four monkeys, which were subjected to superinfection. In the case of one monkey successive infections led to successive revivals of the transmissibility of the strain. In the second monkey, which had been infected only $4\frac{1}{2}$ months, superinfection produced no discernible change. A third monkey, superinfected with a transmissible strain after six months, failed to become infected. The fourth was superinfected two months after the original infection and for the first time became infective to the glands of fly. The first sheep superinfected with a homologous strain of *T. gambiense* 15 months after the first infection, and at a time when the original strain was still transmissible, failed completely to infect the glands of fly. A second sheep superinfected after 16 months' contact with *T. gambiense* failed to respond in any way, and four months later superinfection with a heterologous strain of *T. gambiense* likewise completely failed. The third sheep was infected originally with a feebly transmissible strain which never infected fly. Superinfection 17 months later with a heterologous strain of *T. gambiense* failed to produce any change; but a second superinfection, after a further $2\frac{1}{2}$ months, with *T. rhodesiense* was immediately established and rapidly killed the animal. The goat was treated in a manner similar to the third sheep and behaved in much the same way.

It would appear that prolonged infection with *T. gambiense* leads to the development in the mammal of an immunity against this trypanosome. This immunity acts first upon the transmissibility of the strain by tsetse and has no demonstrable effect on the mere presence of trypanosomes in the animal's circulation. The transmissibility is reduced to a low level and is sometimes abolished altogether. There is reason

to believe that whereas this immunity gradually develops in the course of an infection with a single strain, superinfection stimulates its production and intensifies its effect.

W. Y.

BLANCHARD (M.) & TOULLEC (F.). Un cas de trypanosomiase africaine à évolution lente. [**Case of Trypanosomiasis of Slow Development.**]—*Marseille-Méd.* 1931. Jan. 25. Vol. 68. No. 3. pp. 110-112. [1 ref.]

The authors quote from the literature to show that the length of the first stage (blood lymphatic) may vary very greatly before the disease passes into its second stage and the meninges are invaded. They record in considerable detail a case in which it is possible to fix exactly the date when the patient left the endemic region. He was admitted to hospital at Marseilles on March 19th, 1929, as a case of tuberculous adenitis. The history shows that he had been recruited at Ouagadougou and had left Dakar on February 15th, 1927. During the two years he had served in France without any illness until March, 1929, when in the course of a tuberculosis inspection he was diagnosed as a case of this disease and sent to hospital.

On examination nothing abnormal was found, except general enlargement of the lymphatic glands—cervical, axillary, inguinal, and mediastinal. As their consistency suggested trypanosomiasis one of them was punctured and trypanosomes found. Lumbar puncture gave lymphocytes 2, albumen 0.1, no trypanosomes.

W. Y.

BARLOVATZ (A.). L'exploration méningée dans la maladie du sommeil. [**Meningeal Exploration in Sleeping Sickness.**]—*Bull. Soc. Path. Exot.* 1930. Dec. 10. Vol. 23. No. 10. pp. 1014-1020.

The object of this paper is in the first place to add to the data which have already appeared and in the second place to recommend in lumbar and suboccipital punctures the use of a fine needle as less of a shock to the patient.

The importance of examination of the meningeal fluid in the control of sleeping sickness is recognized by all, but it is still not generally used in routine diagnosis. The author's figures favour its general use and he is convinced that of all the methods it is the most useful.

A single examination of blood, no matter how made, allows of the escape of a very great number of cases, and the same can be said of gland puncture, especially as all patients have not got puncturable glands. At the Pandji hospital during the first five months of 1930, 49 cases were recognized by gland puncture as against 63 in whom lumbar puncture suggested very strongly a diagnosis of trypanosomiasis. One can safely assert that 20 per cent. of the infected in an endemic region do not exhibit parasites in the glands at the time of examination and that at least half do not show them in the blood.

After discussing the results obtained by lumbar puncture the author concludes that although it has not the scientific and diagnostic value of the demonstration of trypanosomes in the blood or gland juice, yet it furnishes signs—increased cell count and so forth—of the first value which afford strong presumptive evidence of sleeping sickness. Alterations in the spinal fluid—great or slight—exist, at least in Mayumbe, in 85 to 90 per cent. of the infected cases taken at random. In a similar group of patients a single search for the parasite in the

blood or gland juice does not enable a diagnosis to be made in more than 70 per cent. of cases.

It appears, then, legitimate to examine the cerebrospinal fluid of all natives coming from a heavily infected region. The author has never had occasion to travel in such a district, but he makes a suboccipital puncture in every native, coming from an endemic area with more than 1 or 2 per cent. of new cases per year, who complains of indefinite symptoms of unknown causation. Often enough he finds alterations in the spinal fluid and sometimes profound changes (1,500 cells) without any definite reason to suspect such.

If meningeal exploration is to be generalized it must of course be harmless and as little painful as possible. Of the 5,000 punctures made in the author's service since 1926, none has been fatal: nevertheless, even a needle of 0.6 mm. bore often causes severe headache. Since the beginning of the present year the author has abandoned lumbar puncture for suboccipital puncture. He uses needles 0.6 mm. in diameter and 5 cm. in length. As such fine needles pierce the native skin with difficulty, he makes an incision first. Over 2,000 suboccipital punctures have been made with only two accidents—aseptic meningitis, as the result of considerable hæmorrhage, which recovered in a week or two. In both these, needles of 0.9 mm. diameter were used and two punctures were made as the fluid did not flow from the first. The author notes that the suboccipital region is very vascular and the introduction of the needle into the muscular tissue of the neck often leads to a considerable hæmorrhage.

W. Y.

BARLOWATZ. Le liquide céphalo-rachidien chez quelques trypanosés devenus arsénorésistants pendant le traitement. [**The Cerebrospinal Fluid in Trypanosomiasis Patients who became Arsenic-resistant during Treatment.**]*—Ann. Soc. Belge de Méd. Trop.* 1930. Dec. 31. Vol. 10. No. 4. pp. 415-421.

The author draws attention to a peculiarity of the cerebrospinal fluid met with in certain arsenic-resistant cases of trypanosomiasis which he has had to deal with at Mayumbe. He has previously published a series of secondary arsenic-resistant cases [this *Bulletin*, Vol. 26, p. 708, and Vol. 27, p. 816 and 829] and he now records others.

These are patients who have been treated either with atoxyl or tryparsamide, or more frequently with both drugs, for several years, apparently with success; suddenly there was a relapse and the trypanosomes were found no longer to yield to tryparsamide or other arsenicals. In general the patients were examined as to the state of their lymphatic glands every six months, and in certain of them lumbar puncture was performed at the same time. The results are summarized as follows:—

Cerebrospinal fluid with 2.6 to 4 leucocytes	...	...	5
Cerebrospinal fluid with normal leucocytes	...	...	17
Cerebrospinal fluid with more than 4 leucocytes	...	...	10

The quantity of albumen present agreed with the leucocyte count. These results are compared with those obtained from 158 cases punctured immediately on diagnosis; amongst these only 16.5 per cent. had less than 2½ leucocytes per cmm.

Secondary arsenic-resistance appears then in a certain number of patients as a new invasion of the organism, which runs a similar course to the original infection. The trypanosomes appear to hide themselves not in the central nervous system, but in one or other of the tissues and to become little by little resistant to tryparsamide. This differentiates clearly secondary arsenic-resistance from a single failure of arsenical treatment in which one finds—especially with atoxyl—a changed cerebrospinal fluid with a peripheral circulation which is often sterile. Brief notes are given concerning 21 of the cases upon which the author has based his argument.

RODHAIN, in the discussion which followed the paper, refers to Barlowatz's hypothesis that during and after the first treatment the parasites have sought shelter in tissues other than the nervous system, and adds that other possibilities occur to him, notably that the patients were reinfected. RODHAIN does not believe that gland puncture is a good method of diagnosing relapses; he considers that it is blood examination that will give information regarding arsenic resistance.

W. Y.

- i. PERGHER (Joseph). Technique nouvelle pour l'étude de la cytologie du liquide céphalo-rachidien. [**New Technique for the Study of the Cytology of the Cerebrospinal Fluid.**—*Ann. Soc. Belge de Méd. Trop.* 1930. Dec. 31. Vol. 10. No. 4. pp. 381–383. [Bact. Lab., Leopoldville.]
- ii. VAN DEN BRANDEN (F.), DUMONT (P.) & NÉLIS (P.). Etude critique sur la valeur d'une nouvelle méthode de dosage de l'albumine du liquide céphalo-rachidien. [**A New Method of estimating the Albumen of the C.S.F. Critical Study.**—*Ibid.* pp. 405–414. [3 refs.] [Central Lab., Administration of Hyg., Brussels.]

i. Cytological study of the cells in the cerebrospinal fluid is unsatisfactory owing to the difficulty of spreading preparations and in getting them to adhere to the slide. The author has devised the following method which, thanks to its simplicity, can be used in the bush :—

In 5 cc. of a 1·5 per cent. solution of sodium citrate in distilled water 0·4 gm. of gelatine are dissolved by the aid of heat: the reaction, which is acid, is adjusted so as to be slightly alkaline. The solution is filtered through filter paper. One or two drops of this gelatine solution is added to 1 cc. of a 1 or 2 per cent. solution of sodium citrate in a centrifuge tube heated to 37–38° C. Lumbar puncture is then made and a few cubic centimetres of the fluid allowed to fall directly into the centrifuge tube, which is then centrifuged at low speed for 10 to 20 minutes, and the supernatant fluid removed. A small drop of the gelatine solution is placed on a slide and by its side a drop of the deposit from the centrifuge tube; the two drops are then mixed together and spread. The author attaches much importance to the actual making of the films. The quicker the films dry the better the preservation of the cells; hence, as little fluid as possible should be used in a relatively strong concentration of gelatine. The best results are given by fluids rich in albumen, and when the cerebrospinal fluid contains but little albumen a small quantity is added to the gelatine.

The gelatine assures the adhesion of the cells to the slide and assists in their staining.

ii. In this article the authors compare the value of Arnaud's new method of estimating the albumen in cerebrospinal fluid [this *Bulletin*, Vol. 27, p. 237 and p. 853] with the classical method of Sicard and Cantaloube. The observations they have so far made do not indicate that Arnaud's method should supercede Sicard and Cantaloube's: the former method does not result in complete precipitation of the proteins, and consequently the figures resulting are less than those obtained from the classical technique.

W. Y.

SICÉ (A.), BOISSEAU (R.), PROVOST (J.) & DENIEL. Le quotient albumineux du sérum chez quelques trypanosomés. [**The Serum Proteins in Trypanosomiasis.**—*Bull. Soc. Path. Exot.* 1931. Mar. 11. Vol. 24. No. 3. pp. 181–184. [1 ref.] [Pasteur Inst., Brazzaville.]

The authors have studied the chief proteins in the serum of a number of cases of sleeping sickness in various stages of the disease. Blood was taken from 13 natives at the same time in the morning; all were on the usual diet of cassava and dried fish. The amount of albumen was determined according to the technique of Hammarsten by saturation of the serum with magnesium sulphate. Of the 13 natives two, who served as controls, were perfectly healthy subjects. The serum of the first gave a protein total of 80·5 per cent.; the serum albumen was 49·3 and the globulin 31·2 (ratio 1·58): the second gave a protein total of 77·8 per cent. with albumen 47·2 and globulin 30·6 (ratio 1·54).

The remaining 11 cases all suffered from trypanosomiasis (*T. gambiense*); 3 were in the first stage and 8 in the meningeal stage. Details of the estimation of the serum proteins in these cases are given in a table. The infected cases may show a considerable diminution in total serum proteins and the loss is mainly due to a decrease of serum albumen.

The ratio $\frac{\text{serum albumen}}{\text{globulin}}$ is always less than it is in normal persons.

W. Y.

CORSON (J. F.). **Observations on the Cerebrospinal Fluid in Nine Cases of Rhodesian Sleeping Sickness during Treatment with Bayer 205 and Tryparsamide.**—*Ann. Trop. Med. & Parasit.* 1931. Aug. 13. Vol. 25. No. 2. pp. 189–193. [2 refs.]

The observations recorded in this paper were made at Maswa in Tanganyika Territory. It was thought that possibly somewhat frequent examinations of the cerebrospinal fluid, made during periods of from about 6 to 12 months, in patients continuously under treatment with Bayer 205 and tryparsamide, might yield data which could be a guide to prognosis and treatment.

Details of the treatment and results of repeated spinal punctures in nine cases are given in a table. The cell count did not fall to normal in any of the patients, but in four of them there was a considerable reduction lasting some months. In one case a relapse, with fever and

trypanosomes in the blood, occurred about the eighth month, although there had been a reduced cell-count for several months before. In another case a total of 50 gm. of tryparsamide within a period of seven months had no apparent effect on the cerebrospinal fluid.

It is remarked that in these cases the dose of Bayer 205 was almost invariably 1 gm.; that of tryparsamide ranged from 2 to 4 gm., usually 2 or 3 gm., given at weekly intervals.

The following are the conclusions :—

"The significance of a reduction of the cell-count of the cerebrospinal fluid to a normal figure cannot be judged from these cases. No inferences as to prognosis in general and treatment can be drawn from the observations. It would seem that the prognosis in all these cases is unfavourable, and that treatment should be continued for want of something better and to guard others.

"The observations indicate that neither Bayer 205 nor tryparsamide can be regarded as likely to cure advanced cases of Rhodesian sleeping sickness, and this is in accordance with clinical experience."

W. Y.

CORSON (J. F.). **A Further Note on Some Cases of Rhodesian Sleeping Sickness treated at Ikoma, Tanganyika Territory, in 1926 and 1927, including Those under the Care of Professor F. K. Kleine.**—*Ann. Trop. Med. & Parasit.* 1931. Mar. 31. Vol. 25. No. 1. pp. 63-68. [3 refs.]

In September, 1930, the author visited Ikoma and made enquiries about cases of sleeping sickness treated by KLEINE and himself in 1926 and 1927. Details of 39 of these were published in a previous paper [this *Bulletin* Vol. 26, p. 697]. The first 37 of these had been under KLEINE'S care; a further 27 cases were treated by Corson up to October 9th, 1927.

The results of treatment of the 64 cases are shown in a table. Twenty-nine (45.3 per cent.) were reported to be alive and eighteen were seen. All were said to be well except two. KLEINE'S cases did not do so well as the author's, 12 only being reported alive out of 37, whilst 17 of Corson's 27 were living. The difference is said to be due to the later batch containing a greater proportion of early cases, owing to the fact that by the middle of 1927, the people got to know the doctors and to recognize the quick beneficial results of treatment. The summary is as follows :—

"1. Of sixty-four patients who received thorough treatment, twenty-nine were reported to be alive about three or more years later. Twenty-seven, or 42 per cent., may be regarded as recovered. This high figure is due to the number of early cases that came for treatment, especially during the later months of the year 1927.

"2. There is no indication, from a study of these cases, that any trypanocidal drug, except Bayer 205, can cure Rhodesian sleeping sickness.

"3. When a parasitic blood relapse has occurred, the prognosis is very unfavourable. In all except a few cases, no form of treatment or combination of trypanocidal drugs seems to lead to cure. Nervous symptoms are sometimes relieved by Tryparsamide when Bayer 205 has failed and the converse occurs, but the relief is only temporary.

"4. One case, viz., No. 46, appears to be one of recovery of a patient with an infected central nervous system."

W. Y.

NAJERA (L.). La punción de la cisterna cerebelo-medular y su importancia en la tripanosomiasis humana. [**Puncture of the Cerebello-Medullary Space and its Importance in Human Trypanosomiasis.**—*Medicina Países Cálidos*. Madrid. 1930. Nov. Vol. 3. No. 6. pp. 520-526. With 3 text figs. French summary (8 lines).

The author states that suboccipital puncture through the occipito-atloid ligament into the cisterna cerebelo-medularis is a simple procedure, devoid of all risk, more easily carried out than lumbar puncture, and of service in cerebral oedema, hydrocephalus, and uraemia, but particularly in sleeping sickness, either for withdrawing fluid or introducing drugs. He has performed the operation on about

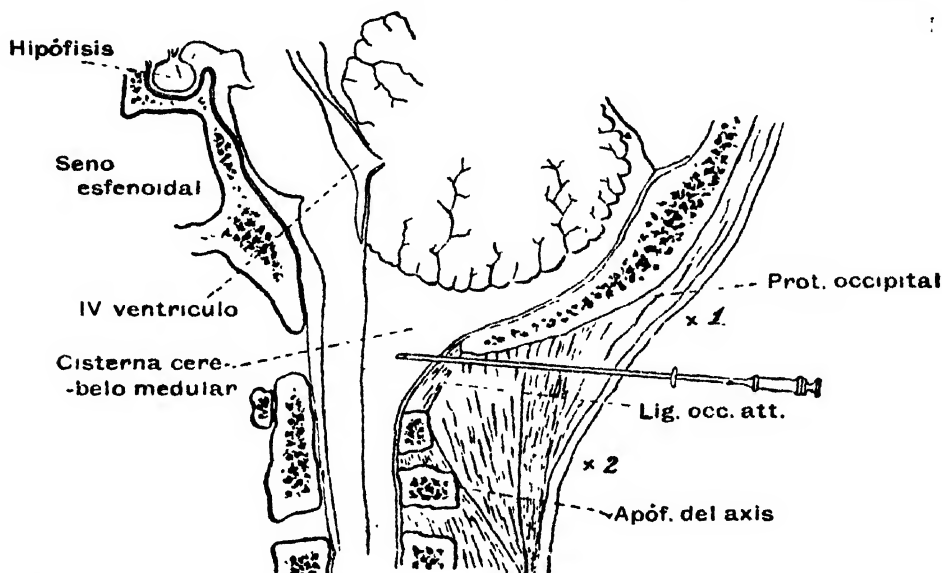


Diagram illustrating position of trocar in making suboccipital puncture through occipito-atloid ligament into the cisterna cerebelo-medularis.

[Reproduced from *Medicina de los Países Cálidos*.]

400 patients without the slightest mishap and states that many present themselves voluntarily at the hospital to have it done, as they prefer it to lumbar puncture. A diagram shows the technique, which appears to be very simple.

H. H. S.

SICÉ (A.). L'Institut Pasteur de Brazzaville et la trypanosomiase humaine. [**The Brazzaville Pasteur Institute and Human Trypanosomiasis.**—*Bull. Soc. Path. Exot.* 1931. Jan. 14. Vol. 24. No. 1. pp. 5-14.

In this address Sicé summarizes the sleeping sickness work of the Pasteur Institute at Brazzaville. The Institute is responsible for Brazzaville and surrounding country.

The disease among the European population of the Congo is slight, only 0.56 per cent. being infected. If, however, the officials, who formerly were heavily infected and are now almost free, are excluded, the remainder of the European population—traders, missionaries, etc.—are infected to the extent of 1.47 per cent.

Among the native population the results are much more encouraging. In 1910, of a total of 4,330 examined at the Pasteur Institute 324 (7.4 per cent.) were infected; in 1929, of 23,510 persons examined only 228 (0.9 per cent.) were infected. No less than 87.5 per cent. of the infected have come up spontaneously for examination—gland puncture and spinal puncture.

Passing to the subject of chemotherapy the author states that the arsenobenzols and acetylarsan have given very inconstant results. He leaves Bayer 205 and Fournau 309 to a future communication, and limits himself in the present paper to a discussion of the results obtained with atoxyl, either alone or associated with emetic, Fournau 270, tryparsamide and tryponarsyl.

Atoxyl. Between 1906 and 1919 almost all the 2,797 patients treated at Brazzaville received atoxyl and in almost every case the injections were less than 1 gm. The results were not striking. From 1920 to 1928, the patients, 1,118 in number, were given doses of 15 to 20 mgm. per kilo of body weight. Of these, 663 have been followed carefully; they can be divided into three groups:—

- 316 with only blood and lymphatic infection,
- 208 with lesions of the cerebrospinal system,
- 139 unclassified as spinal puncture was not performed.

Of the 1st group, 249 are cured—198 without any other drug and 51 with the ultimate use of tryparsamide; 43 are dead and 24 have disappeared. Of the 2nd group, 34 are cured—2 without any other drug and 32 with the aid of tryparsamide; 1 has improved, 141 are dead and 32 have disappeared. Of the 3rd group, 62 are cured—45 without other drugs and 17 with the aid of tryparsamide; 63 are dead and 14 have disappeared. It is remarked that during this work it was found that 105 (15.9 per cent.) exhibited blood relapses and that of these 11.1 per cent. occurred during the first year of treatment.

Tryparsamide. Here are grouped together cases entirely treated with this drug and those previously treated unsuccessfully with other drugs. Of 51 cases in the first stage of the disease 19.6 per cent. have had blood relapses and 3.9 per cent. have progressed and presented meningeal lesions. Of 256 patients with nervous involvement 4.6 per cent. have had blood relapses, 16 per cent. have again relapsed with nervous symptoms, and 8.9 per cent. have died. The results given with tryponarsyl, the Belgian product, have been identical.

Fournau 270. This is the sodium salt of acetyl-p-amino-o-oxyphenyl arsenic acid. Between 1925 and 1929, 357 cases have been treated. Of the 106 patients in the first stage of the disease 3.7 per cent. have had relapses, 2.8 per cent. have progressed to the nervous stage and 33 per cent. have not been followed up. Of 251 patients in the second stage of the disease, 3.5 per cent. have had blood relapses, 13.1 per cent. have progressed, 51.3 per cent. have had prolonged amelioration sometimes definite, 14.3 per cent. have died and 17.5 per cent. have disappeared.

The doses of tryparsamide and Fournau 270 varied from 15 mgm. to 35 mgm. per kilo; the injections were given every seven days.

The author contrasts the results obtained with these three drugs in the following tables :—

Patients in the first stage of the disease.

	Atoxyl.	Tryparsamide.	" Fourneau 270."
	Per cent.	Per cent.	Per cent.
Blood relapses ...	15·9	19·6	3·7
Nervous developments	25·0	3·9	2·8

Patients in the second stage of the disease.

	Atoxyl.	Tryparsamide.	" Fourneau 270."
	Per cent.	Per cent.	Per cent.
Blood relapses ...	—	4·6	3·5
Progressive evolution ...	—	16·0	13·1
Dead ...	67·0	8·9	14·3

The accidents following the use of tryparsamide were practically nil. Some precautions were necessary in the case of Fourneau 270. It may produce vomiting some hours after administration, and in advanced cases may be followed by visual troubles going on to blindness.

It is stated that of the five compounds prepared by Dr. STRATMAN THOMAS of Wisconsin, viz., 73-etharsanol, 115, 130, 134 and 139, only 115 gave results approximating to those of tryparsamide.

W. Y.

VAUCÉL (M.) & BOISSEAU (R.). L'action du moranyl dans l'arséno-résistance de la trypanosomiase humaine. [**Action of Moranyl in the Arsenic Resistance of Human Trypanosomiasis.**]—*Bull. Soc. Path. Exot.* 1931. May 13. Vol. 24. No. 5. pp. 374–378. [5 refs.] [Pasteur Inst., Brazzaville.]

This work, which was undertaken at Brazzaville, relates to the action of moranyl (Bayer 205) in cases of human trypanosomiasis resistant to arsenicals; most of the patients were in the meningeal stage and had been unsuccessfully treated with tryparsamide.

A. Meningeal cases. As the cases were all very similar the results are not given separately in detail, but are summarized in a table. The injection of tryparsamide invariably resulted in an amelioration of the condition and in a return of the condition of the cerebrospinal fluid towards the normal. The author considers arsenic-resistance to be indicated by a stabilization of the cerebrospinal formula and a persistence of the albumen at about 0·40; this condition presages invariably a renewal of the evolution of the disease. Such cases are relatively rare. More frequently after an apparent clinical cure with normal cerebrospinal findings there is found, after a lapse of 3 to 6 months, an increase of albumen in the spinal fluid. A further course of tryparsamide may again produce a normal spinal fluid, but generally

speaking the excess of albumen indicates the development of a relapse on which arsenic has no action.

When once arsenic-resistance, whether initial or after a relapse following an adequate course of treatment, has developed, it is useless to continue arsenical treatment.

As the table shows, a check is almost all one can hope for from the treatment of such cases by moranyl. In only a single case did the cerebrospinal fluid become normal. The author points out that he does not hesitate to classify as "checks" all cases in which the albumen of the spinal fluid fails to fall below 0.35 no matter whether the cell count has become normal or not; such cases always relapse.

B. Gland and blood cases. It is unfortunately true that prolonged treatment with tryparsamide, notwithstanding the magnificent effects on the cerebrospinal fluid, is frequently followed by the reappearance of trypanosomes in the blood. Relapses are still more frequent after shorter courses given to patients in the first stage of the disease. At the Pasteur Institute of Brazzaville tryparsamide is no longer used for the treatment of early cases. It is replaced by Fournau 270 [acetyl-p-amino-oxyphenyl arsenic acid] which gives only 3 per cent. of relapses as compared with 18 per cent. for tryparsamide. Even cases in which tryparsamide fails are susceptible to Fournau 270 and likewise to atoxyl. If, however, it is a case of true arsenic-resistance moranyl is indicated. An illustration is quoted at length.

The author considers that amongst the many trypanocidal substances available for use in the first stage of the disease tryparsamide is the worst. He uses Fournau 270 with confidence, or in cases of intolerance (especially vomiting in women) the combination atoxyl-emetic. When there is true arsenic resistance he advises moranyl alone or with emetic. In the second stage of the disease tryparsamide alone can be employed with any hope of success.

W. Y.

LAUNOY (L.) & PRIEUR (Marie). Actions trypanocides synergiques du 205 Bayer-309 Fournau et d'un sérum spécifique, dans la trypanosomiase expérimentale à *Trypanosoma Brucei*, de la souris. [**Synergic Action of Bayer 205 and Specific Serum in Treatment of Experimental Trypanosomiasis in Mice.**]—*Bull. Soc. Path. Exot.* 1931. Apr. 15. Vol. 24. No. 4. pp. 311-327. [1 ref.]

Cats which have been protected against *T. brucei* by a prophylactic injection of Bayer 205 [this *Bulletin*, Vol. 27, p. 834] develop, when the refractory state is past, infections, the evolutions of which are very inconstant. As a rule these infections are very prolonged and may sometimes terminate in spontaneous cure. Usually the normal virulence of the parasite is recovered at the second passage, but this is not invariably the case. Details are given of series of mice infected from two of the authors' cats in which the infections ran prolonged courses for several passages through mice and only gradually recovered their normal virulence.

The authors believe that this diminution in the virulence of the virus is due to two antagonistic factors, viz., specific antibody and minute traces of drug. A large number of experiments is recorded which show that a fraction of the curative dose of Bayer 205, i.e., $\frac{1}{4}$ suffices, when given with the specific serum obtained from nagana-infected rabbits, to cure mice infected with *T. brucei*.

W. Y.

DUBOIS (A.). A propos de l'action "in vitro" de la tryparsamide sur les trypanosomes. [**Action of Tryparsamide on Trypanosomes in Vitro.**].—*Ann. Soc. Belge de Méd. Trop.* 1931. Mar. 31. Vol. 11. No. 1. pp. 93-99. [6 refs.] [School of Trop. Med., Brussels.]

The author refers to the work of the reviewer and his colleagues on the trypanocidal action of arsenicals *in vitro* [*ante*, p. 350]. He is particularly concerned with the statement that pentavalent arsenicals, such as tryparsamide, are but slightly trypanocidal *in vitro*, viz., 1 : 200 in 6 hours and 1 : 1,600 in 24 hours at 37° C. As BRUYNOGHE and Dubois had found that tryparsamide was inactive *in vitro* at laboratory temperatures, the author determined to re-examine the subject, using the reviewer's technique and conducting his observations at 37° C. He worked with *T. pecaudi* and his results were similar to those of the reviewer.

Dubois enquires whether the results could be explained on the hypothesis that the serum of the nutrient medium converted the tryparsamide into trypanotoxyl, but came to the conclusion that this was not the explanation.

W. Y.

KOLMER (John A.) with the Assistance of Anna M. RULE. **The Prophylaxis of Experimental Trypanosomiasis by the Oral Administration of Arsenical Compounds and Germanin.**—*Amer. Jl. Trop. Med.* 1931. July. Vol. 11. No. 4. pp. 261-272. [6 refs.] [Research Inst. of Cutaneous Med., Philadelphia.]

The author has conducted experiments on rats with a view to ascertaining whether the oral administration of such drugs as stovarsol, treparsol, atoxyl, tryparsamide, and Bayer 205 had any prophylactic action against infection with *T. equiperdum*.

His conclusions are as follows :—

" 1. Stovarsol and treparsol in doses of approximately 0.030 to 0.040 gram per kilogram of weight by oral administration for three to ten days were effective in preventing trypanosomiasis of rats infected with *Tr. equiperdum*.

" 2. Atoxyl was slightly more effective, as doses of 0.020 to 0.030 gram per kilogram per day by oral administration for five to ten days prevented infection.

" 3. Tryparsamide by oral administration was ineffective in dose of 0.050 gram per kilogram once a day for five to ten days.

" 4. ' Bayer 205 ' or ' Germanin ' was ineffective in dose of 0.020 gram per kilogram of weight by oral administration once a day for three to ten days.

" 5. As a general rule these compounds were slightly more effective when their administration was started twenty-four hours after infection than when given before infection.

" 6. If *Tr. gambiense* and *Tr. rhodesiense* are as susceptible as *Tr. equiperdum* to stovarsol, treparsol and atoxyl, it would appear that the oral administration of these compounds in amounts without danger of producing toxic amblyopia or other toxic manifestations, like 4 tablets a day for a week at a time followed by an intermission, may be of practical value in the prophylaxis of trypanosomiasis of human beings temporarily exposed to infection."

W. Y.

LOURIE (E. M.). **The Effect of 'Höchst 4002' on *Trypanosoma gambiense* and *T. evansi* in Mice and Rats.**—*Ann. Trop. Med. & Parasit.* 1931. Mar. 31. Vol. 25. No. 1. pp. 123-127. [2 refs.]

In view of the promising results obtained by GIEMSA [this *Bulletin*, Vol. 27, p. 832] in the treatment of mice infected with *T. brucei* (Prowazek), the author decided to examine the trypanocidal action of "Höchst 4002" in mice and rats infected with *T. gambiense* and with *T. evansi*.

The conclusions are :—

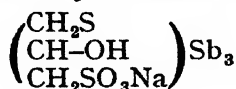
"The values obtained in the writer's series of therapeutic experiments with 'Höchst 4002' are all very considerably less favourable than those quoted by Giemsa; and it is interesting, in this conclusion, to note that disappointing results have also been recorded by Nieschulz and Wawo-Roentoe (1930), not only in experiments on mice, rats and guineapigs infected with a strain of *T. evansi*, but also in the case of similarly infected horses.

"The prophylactic value of 'Höchst 4002' as judged by the writer's experiments, is negligible."

W. Y.

LÉPINE (Pierre). Action trypanocide du stibiothiopropanol sulfonate de sodium. [**Trypanocidal Action of Stibiothiopropanol Sulphonate of Sodium.**]—*C.R. Soc. Biol.* 1931. June 12. Vol. 107. No. 19. pp. 594-595. [Pasteur Inst., Paris.]

This preparation was made by LUMIÈRE and has the formula :—



It contains 15 per cent. of antimony and is a white crystalline substance which slowly turns yellow if exposed to light. Mice tolerate 4 mgm. per 20 gm. of body weight and rabbits 20 mgm. per kilo. It is immaterial whether the drug is given intravenously or intramuscularly.

It has no action on *Sp. duttoni* or *Sp. gallinarum*, but is active in maximum doses on *Sp. pallida* and *Sp. cuniculi*, although relapses soon occur. On rabbits and mice infected with *T. gambiense*, *T. brucei* or *T. evansi* it is definitely active and compares favourably with other antimonials.

W. Y.

LEVADITI (C.), BARDET (J.), TCHAKIRIAN (A.) & VAISMAN (A.). Le gallium, propriétés thérapeutiques dans la syphilis et les trypanosomiases expérimentales. [**Therapeutic Properties of Gallium in Syphilis and Trypanosomiasis.**]—*C.R. Acad. Sci.* 1931. May 4. Vol. 192. No. 18. pp. 1142-1143.

During the course of their studies on the therapeutic properties of certain elements, the authors have discovered that the rare metal gallium is both trypanocidal and spirillicidal. Of the derivatives studied, the tartrate was the most active. It apparently cured experimental syphilis in the rabbit, but failed with the other spirochaetal infections. The curative dose for mice infected with *Trypanosoma evansi* was 4.5 mgm. per 20 gm. of mouse and the tolerated dose 15 mgm. Trypanosomes disappeared from the blood in 24 to 30 hours; some

mice were definitely cured, others relapsed. Similar results were obtained with other trypanosomal infections, viz., *T. brucei*, *T. congolense*, *T. pecaui* and *T. gambiense*.

W. Y.

YORKE (Warrington), MURGATROYD (Frederick) & HAWKING (Frank). **Studies in Chemotherapy. IV.—The Action *in vivo* of Certain Arsenical and Antimonial Compounds and of Bayer 205 on *T. rhodesiense* and on Atoxyl- and Acriflavine-Resistant Strains of this Parasite.**—*Ann. Trop. Med. & Parasit.* 1931. Aug. 13. Vol. 25. No. 2. pp. 313-349. [4 refs.]

In the 2nd paper of this series the two senior authors recorded the action *in vitro* of certain arsenical and antimonial compounds on *T. rhodesiense* and on atoxyl- and acriflavine-resistant strains of this parasite [*ante*, p. 350]. Now the authors examine *in vivo* the validity of their deductions. The animal was the mouse and injection intraperitoneal. The limitations of this method are detailed, such as the limit to the concentration of drug employable, the lack of information as to the concentration of the drug in the blood. Certain terms are defined :—

" *Minimum Effective Dose* (M.E.D.). The minimum dose which sufficed to clear the blood of at least 80 per cent. of the treated mice, irrespective of time.

" *Minimum Curative Dose* (M.C.D.). The minimum dose which sufficed to cure (thirty days' observation) at least 80 per cent. of the treated mice.

" *Lethal Dose* (L.D.). The minimum dose which killed at least 50 per cent. of the treated mice within twenty-four hours in the case of the inorganic, trivalent organic, and arsenobenzol compounds, and within three to four days in the case of the pentavalent organic compounds."

It is noted that "lethal dose" is used in a special sense and the question of time is discussed at some length, in regard specially to the slow-acting pentavalent compounds.

The result of this work is summed up in 22 tables (occupying 24 pages) in which the following drugs were respectively employed—atoxyl, reduced atoxyl thioglycollate, sodium 4-hydroxy-phenyl-arsenate, 4-hydroxy-phenyl-arsenoxide, arsacetin, reduced arsacetin, trypanamide, reduced trypanamide thioglycollate, sodium stovarsol, reduced stovarsol thioglycollate, halarsol, halarsol thioglycollate, novarsenobillon, disodium 4-glycine-phenyl-arsenate, arsenophenylglycine, sodium arsinite, stibenyl, stibosan, tartar emetic, acriflavine, Bayer 205; three strains of parasite being employed in each case. The last table gives the lethal doses of the various compounds, the M.E.D. and M.C.D. for the normal and resistant strains and their minimum trypanocidal concentrations for the same strains *in vitro*. The summary of this paper, which must be consulted in the original by serious students, is as follows :—

" 1. An attempt has been made to confirm by experiments *in vivo* the conclusions reached in a previous paper from observations *in vitro* regarding the action of a considerable number of arsenical and antimonial compounds on *T. rhodesiense* and on atoxyl- and acriflavine-resistant varieties of this parasite.

" 2. The minimum effective dose (M.E.D.) and the minimum curative dose (M.C.D.) were determined for each drug in respect of infections in mice produced by the normal strain.

" 3. No differences could be detected between the reactions of the

two resistant strains to the various drugs. Owing to the fact that with most of the drugs these infections resisted doses up to and including the lethal dose, it proved impossible except in the case of disodium-4-glycine-phenyl-arsenate, arsenophenyglycine, stibosan, tartar emetic and Bayer 205, to determine exactly even the minimum effective dose for these strains; and only in the case of Bayer 205 could the minimum curative dose be ascertained.

"4. Notwithstanding the limitations which this fact has necessarily imposed on these *in vivo* experiments, we have been enabled to obtain sufficient information to confirm the main conclusions reached from our *in vitro* work. To the various arsenoxides and arsenobenzols, the resistant strains exhibited different degrees of resistance. For example, in the case of arsenophenyglycine, the M.E.D. for the resistant infections was practically the same as that for the normal infection, whereas in the case of reduced tryparsamide thioglycollate the M.E.D. for the resistant strains was undoubtedly considerably more than sixty times that for the normal strain.

"5. This fact, together with the observation that the resistant infections were no more resistant to sodium arsinite than was the normal strain, indicates that the resistance of the atoxyl- and acriflavine-resistant strains is not a resistance to arsenic but is dependent on the structure of the substituted phenyl radical in the various aromatic compounds of arsenic and antimony.

"6. This contention is supported by the fact that whilst the resistant strains proved to be definitely resistant both to stibenyl and to stibosan, they were just as susceptible to tartar emetic as was the normal strain.

"7. It is interesting to note that the resistant strains responded to Bayer 205 in almost exactly the same manner as did the normal strain.

"8. The facts that the M.E.D. and M.C.D. of the arsenoxides and of the arsenobenzols are exceedingly small as compared with the M.E.D. and M.C.D. of the corresponding pentavalent compounds, and the sterilization of the peripheral circulation is produced more rapidly by the arsenoxides and arsenobenzols than by the pentavalent compounds, support the hypothesis that therapeutic activity in the case of the former compounds is due to the direct trypanocidal effect of the unchanged drugs and in the case of the latter to an indirect action dependent on their reduction, in the body of the host, to the corresponding trivalent forms.

"9. Further strong support to this hypothesis is provided by the observation that both in the case of the normal strain and in that of the resistant strains, there was found to be a close parallelism between the minimum effective doses of the various drugs *in vivo* and their minimum trypanocidal concentrations *in vitro*. In fact, all strains responded in the *in vivo* experiments in precisely the manner in which the previous *in vitro* experiments had indicated that they would respond, on the assumption that the therapeutic activity of the arsenoxides, arsenobenzols, sodium arsinite and tartar emetic depended on the direct trypanocidal power of the unaltered drugs, whilst that of the pentavalent compounds depended on their reduction in the body of the host into their corresponding trivalent forms."

A. G. B.

YORKE (Warrington), MURGATROYD (Frederick) & HAWKING (Frank).
Studies in Chemotherapy. V.—Preliminary Contribution on the Nature of Drug Resistance.—*Ann. Trop. Med. & Parasit.* 1931. Aug. 13. Vol. 25. No. 2. pp. 351–358. [8 refs.]

The first observation of resistance of trypanosomes to drugs was made in EHRLICH's laboratory by FRANKE and ROEHL (1907), who fed nagana-infected mice with parafuchsin, to which the parasites developed

a resistance communicable to other mice. A large amount of work has followed. According to EHRLICH this resistance is due to a reduction of the avidity of the specific chemoreceptors for the drug to which the strain has been made resistant. DALE criticized this hypothesis in 1923 and VOEGTLIN, DYER and MILLER (1924) write of "the total inadequacy of this theory" [see this BULLETIN, Vol. 22, p. 142]. Regarding arsenic resistance as a relative term relating the resistance of one strain to that of another strain the authors give two possible explanations: "The strain with the higher resistance may owe its greater resistance either to reduction in permeability of the parasites for the drug, or to a fortification of the natural physicochemical defence mechanism of the protoplasm against the toxic action of the drug."

In support of the second possibility they cite experiments of VOEGTLIN, DYER and LEONARD on the toxic action of arsenoxide with reference to sulphydryl compounds of protoplasm.

"According to Voegtlin's hypothesis—if we understand it correctly—a strain of trypanosomes exhibiting a pronounced degree of drug resistance should, on exposure to a given concentration of the arsenical to which it is resistant, be capable, in virtue of its excess of sulphydryl compounds, of absorbing more of the arsenical than is the homologous normal strain; whilst according to Ehrlich's theory, which postulates that resistance on the part of a strain is due to a reduction of the avidity of its specific chemoreceptors, the resistant strain should be capable of absorbing less of the arsenical, to which it is resistant, than is the normal strain."

Experiments to test this were performed by the author. They cannot be described here. They show that:

"When normal and atoxyl-resistant strains of trypanosomes are incubated at 37° C. for one hour, in nutrient media, containing similar concentrations of reduced tryparsamide, their behaviour is essentially different, in that whilst the normal strain rapidly absorbs the drug, the atoxyl- (or acriflavine-) resistant strain fails to remove any appreciable quantity of the drug from the medium.

"This fact is in harmony with Ehrlich's theory that drug-resistance is due to a lowered avidity of the specific chemoreceptors of the parasite, and also with any hypothesis which explains drug-resistance on the basis of an increased impermeability of the parasite for the drug. It appears to render untenable the hypothesis of Voegtlin, Dyer and Miller, which postulates that a trypanosome strain owes its arsenic resistance to a sufficient excess (above the physiological requirement) of sulphydryl compounds available for combination with arsenic."

A. G. B.

ROSKIN (Gr.). Arzneimittel und ultraviolette Strahlen. VIII. Mitteilung. Zur Methodik der kombinierten Therapie. [**Drugs and Ultraviolet Rays. Method of Combined Treatment.**]—*Ztschr. f. Immunitätsf. u. Experim. Therap.* 1930. Vol. 69. No. 3/4. pp. 240-243. [2 refs.] [Microbiol. Research Inst., Education Commissariat R.S.F.S.R., Moscow.]

In earlier published work Roskin and his collaborators have shown that novarsolan plus U.V. rays will sterilize trypanosome-infected mice while novarsolan by itself in the same dose fails. The technique of the experiments is here given. GIEMSA and ELLENBOGEN failed to get the same results and Roskin now points out that these authors did not remove the hair before applying the rays. To ensure their penetration it is necessary to remove all the hair from the mouse's back.

A. G. B.

ROSKIN (Gr.). Arzneimittel und ultraviolette Strahlen. IX. Mitteilung. Beiträge zur Analyse der Kombinierten Therapie. [**Drugs and Ultraviolet Rays. IX. Communication. Analysis of the Combined Therapy.**—*Ztschr. f. Immunitätsf. u. Experim. Therap.* 1931. Vol. 69. No. 5/6. pp. 473-483. [10 refs.] [Microbiol. Research Inst., Education Commissariat R.S.F.S.R. Moscow.]

The author commences by summarizing the previous work of himself and others on this subject [this *Bulletin*, Vol. 27, p. 233 and p. 837]. In the present communication details are given of a number of experiments devised with the object of throwing light on the mechanism of the phenomenon.

The conclusions are :—

1. In the serum of mice which have been subject to ultra-violet radiation there is a special Factor A. This is responsible for the definite increase of the therapeutic action of neosalvarsan on combined treatment of mice infected with *T. equiperdum*.

2. This factor is destroyed by heating at 56° C. for half an hour, and also by ultraviolet radiation of the serum *in vitro*. It is absorbed out of the serum by kaolin.

3. Observations show that the active mesenchyme of the skin and the whole reticulo-endothelial system have a part in the production of Factor A. The serum of splenectomized mice is either entirely lacking in Factor A or contains it in insufficient amount.

W. Y.

GIEMSA (G.) & JIROVEC (O.). Salvarsan und ultraviolette Strahlen. [**Salvarsan and Ultraviolet Radiation.**—*Ztschr. f. Immunitätsf. u. Experim. Therap.* 1931. Vol. 70. No. 5/6. pp. 466-471. With 1 text fig. [4 refs.] [Inst. for Ship. & Trop. Diseases, Hamburg.]

The authors have re-examined the claim of ROSKIN and ROMANOWA that the action of salvarsan is enhanced by ultra-violet radiation [this *Bulletin*, Vol. 27, p. 233]. Their experiments completely failed to confirm the observations of the Russian workers.

W. Y.

CITRON (Heinrich). Versuche ueber die Beeinflussung der Salvarsan-festigkeit. [**Experiments on the Influencing of Salvarsan-Resistance.**—*Ztschr. f. Immunitätsf. u. Experim. Therap.* 1931. Vol. 69. No. 5/6. pp. 464-472. [42 refs.] [Reich Health Office, Berlin-Dahlem.]

Reference is made to the work of KABELÍK* on the therapeutic properties of sodium thiosulphate, in which the statement is made that this substance is able to overcome drug-resistance. The author mentions that optochin resistance in cases of *Ulcus serpens corneae* is influenced in a favourable manner by simultaneous administration of thiosulphate. Again, there are the records of WERNIGK, and those of BEINHAEUER and JACOB that patients with salvarsan resistant syphilis and a persistent Wassermann reaction can be benefited by the combination of the specific drug and sodium thiosulphate [see *Bull. of Hyg.*, Vol. 3, p. 876].

* *Ztschr. f. Immunitätsforsch.* Vol. 58. p. 434.

Citron has examined the question in an experimental study of mice infected with a salvarsan-resistant strain of *T. brucei*. The resistance of the strain was practically complete in that whilst 1/125 gm. of salvarsan per 20 gm. of mouse cured the infection, smaller doses of 1/250 gm. failed to do so. Four mice were infected with this strain and when parasites appeared in their blood the first was given intravenously an injection of 1 cc. of a 2·5 per cent. solution of sodium thiosulphate and the other three, which served as controls, were given salvarsan in doses of 1/125 gm., 1/250 gm. and 1/500 gm. per 20 gm. of mouse respectively. The sodium thiosulphate had not the slightest influence on the course of the infection, and as soon as parasites were numerous in the blood of the animal which had received this substance, four more mice were inoculated from it. When parasites appeared in their blood one was given sodium thiosulphate and the remaining three controls salvarsan as before. From the sodium thiosulphate animal the strain was carried on as shown in a table until the 22nd passage. The table shows that for the first 17 passages the salvarsan resistant character of the strain remained unchanged, but at the 18th passage it had completely disappeared, so that such minute doses as 1/8000 gm. of neosalvarsan sufficed to cure. A second experiment gave exactly similar results.

W. Y.

ADAMS (A. R. D.). **The Action of Various Sera, *in vitro*, on the Gut and Salivary Gland Forms of *T. rhodesiense* and *T. gambiense* from *Glossina palpalis*.**—*Ann. Trop. Med. & Parasit.* 1931. Aug. 13. Vol. 25. No. 2. pp. 299–311. [4 refs.] [Human Trypanosomiasis Inst., Entebbe, Uganda.]

During the course of an investigation into the action, *in vitro*, of various sera on a number of strains of *T. rhodesiense* and *T. gambiense* in laboratory animals, the opportunity was taken of determining the reactions to these sera of the various stages of the parasites occurring in experimentally infected *Glossina palpalis*.

The following strains of trypanosomes were used in this work :—

“(I) Four strains of *T. rhodesiense* . . . very recently recovered from human cases in the Kahama area of Tanganyika. The majority of the flies used were infected either from the original guineapigs inoculated from man or from monkeys subinoculated from these guineapigs.

“(II) A strain of *T. gambiense* . . . isolated from man in the West Nile area of Uganda early in 1929, and since maintained in a sheep and several monkeys by cyclical transmission through *G. palpalis*.”

A detailed account is given of the technique employed, and the results of the experiments are summarized in tables. The original paper should be consulted by those interested.

The following summary is given :—

“1. A technique is described whereby the action of various sera on the gut and salivary gland forms of the pathogenic trypanosomes from *G. palpalis* can be studied *in vitro*.

“2. It is shown that these forms, in a suitable medium, can be maintained alive *in vitro* for a period of at least twenty-four hours at laboratory temperatures (24° C. to 29° C.). They usually survive in spite of the considerable bacterial invasion often unavoidably present, and in fairly sterile media generally show definite evidence of multiplication.

"3. The fresh sera of a number of different mammals, birds, and reptiles are rapidly trypanocidal to the gut forms of *T. rhodesiense* and *T. gambiense* recovered from laboratory infected *G. palpalis*.

"4. Heating these sera to 56° C. for twenty minutes, filtering them through a Berkefeld filter candle, or treating them with ammonia destroys their trypanocidal powers. As haemolytic complement is removed by these procedures, but was found to be present in the trypanocidally active sera, it is concluded that complement is the trypanocidal body.

"5. These same sera, even when undeactivated, exert no lytic action on the salivary gland forms of *T. rhodesiense* and *T. gambiense* *in vitro*. The gland forms are thus shown to differ fundamentally from the gut forms; were this not the case, it would be difficult to account for the infection of mammals by the injection of salivary gland forms.

"6. It has been shown that blood, recovered from recently fed *G. palpalis*, is devoid of haemolytic complement, no complement being detected in blood obtained from flies within ten minutes of feeding.

"7. The presence of an anti-complementary substance has been demonstrated in saline emulsions of the mid-intestines, and to a less extent in those of the salivary glands, of unfed *G. palpalis*, and it is probably due to the presence of this substance that infected flies are not sterilised by subsequent feeds of normal complement-containing blood."

W. Y.

- i. CORSON (J. F.). **The Effects of the Injection of Human Blood Serum into White Rats infected with *Trypanosoma rhodesiense*.**—*Kenya & East African Med. Jl.* 1931. Jan. Vol. 7. No. 10. pp. 292-296. [2 refs.]
- ii. ——. **Further Observations on the Trypanocidal Action of Human Blood Serum on *Trypanosoma rhodesiense* in White Rats.**—*Jl. Trop. Med. & Hyg.* 1931. Mar. 16. Vol. 34. No. 6. pp. 81-83. [5 refs.]

i. On account of the recent work by the reviewer and his colleagues on the action of human serum on trypanosomes [this *Bulletin*, Vol. 27, p. 804], the author records a number of observations which he has made in Tanganyika. The trypanosomes were obtained from natives infected in the Mwanza province. In 6 of the 10 experiments the rats were infected directly from the patients, whilst in the other 4 the rats were infected from sheep or goats in which animals the strain had been maintained by direct passage for about three months.

The serum used came from 8 healthy natives who had never had sleeping sickness, and from an Englishman who had been naturally infected with Rhodesian sleeping sickness in May, 1928. In every instance the serum was given subcutaneously.

Details of the 10 experiments are given and should be consulted in the original by those interested.

The following is the summary :—

"1. In ten experiments in which seven strains of *T. rhodesiense* were used and blood serum from nine healthy persons, there was a great reduction within 24 hours in the number of trypanosomes in the peripheral blood of white rats. Experiment 6 is possibly an exception as on the day of injection the number of trypanosomes was too few to show any striking change.

"2. The effect of the injection of human serum was greater in four experiments in which the trypanosomes had been maintained in sheep

and goats for three months than in the other experiments in which the rats had been infected directly from human beings. In only two of the latter experiments, however, were two cubic centimetres of serum injected.

" 3. Although most of the trypanosomes were caused to disappear from the peripheral blood, in no case did a cure result.

" 4. It is interesting to recall that Duke (1912) found that the injection of normal human blood serum into monkeys infected with *T. gambiense* caused a temporary disappearance of the trypanosomes from the blood. As this did not occur in the case of rats the author attributed the effect to some condition present in the monkeys which causes them to react to human serum."

ii. This paper, an extension of the previous one, records the results obtained in 36 similar experiments. The results are set forth clearly in a couple of tables which should be consulted by those interested. The author writes :—

"The serum of some persons had more effect than that of others, but that of sleeping sickness patients did not show, on the whole, less trypanocidal action than that of healthy persons."

W. Y.

AMAKO (T. H.). Beiträge zur Kenntnis der Schutzkraft der Milz und des Retikuloendothelialsystems gegen eine Infektion des Organismus durch die *Spirochaeta Duttoni* und *Trypanosoma Gambiense*. [**Protective Power of the Spleen and Reticulo-Endothelial System against Infection of the Organism by *Sp. duttoni* and *T. gambiense*.**]—*Fukuoka-Ikwadaigaku-Zasshi* (*Fukuoka Acta Med.*). 1930. Feb. Vol. 23. No. 2. [In Japanese. German summary pp. 12-13.]

—, Ueber die Rolle der Leber und der Milz bei der Antikörperbildung bei experimenteller Trypanosomiasis. [**The Role of the Liver and Spleen in Antibody Formation in Experimental Trypanosomiasis.**]—*Ibid.* [In Japanese. German summary p. 13.] [Bact. Inst., Imperial Kyushu Univ., Fukuoka, Japan.]

i. In infections of mice and guineapigs with spirochaetes and trypanosomes, the resistance of the animal is most diminished after combined splenectomy and blockade of the reticulo-endothelial system, less so after splenectomy alone, and least after blockade alone. After splenectomy compensation sets in on the fourth day. Leaving a portion of the spleen suffices for the preservation of the protective power of the animal.

ii. The spleen and liver are the sites of formation of the agglomeratins. At the commencement of immunization this activity is very great especially in the latter organ. With the passage of time after vaccination, however, agglomeratin formation occurs notwithstanding splenectomy and destruction of liver function. On intraperitoneal implantation of liver or spleen in an immunized rabbit, agglomeratin can be clearly observed ; the process is greater in the spleen than in the liver. Small injections directly into the parenchyma of the spleen or liver produce agglomeratin formation more quickly than does intravenous vaccination. Investigation of the organ extracts of immunized rabbits shows that the spleen and liver are the chief sites of agglomeratin formation.

W. Y.

- i. MURAKAWA (G.). Lokale Immunisierung bei Trypanosomeninfektion. [**Local Immunisation in Trypanosomal Infections.**]—*Fukuoka-Ikwadaigaku-Zasshi (Fukuoka Acta Med.)*. 1930. Aug. Vol. 23. No. 8. [In Japanese. German summary pp. 64-65.]
- ii. —. Perorale Immunität gegen Trypanosomen. [**Peroral Immunity against Trypanosomes.**]—*Ibid.* [In Japanese. German summary p. 65.]
- iii. —. Partialantigen der Trypanosomen. [**Partial Antigen of Trypanosomes.**]—*Ibid.* [In Japanese. German summary pp. 65-66.]
- iv. —. Beiträge zur Kenntnis der Abwehrkraft des Trypanosoma-Immunserum gegen Infektion. [**Defensive Power of Trypanosome-Immune Serum against Infection.**]—*Ibid.* [In Japanese. German summary p. 66.]
- v. —. Kleine Versuche ueber embryonale Trypanosomen-Infektion. [**Small Experiments on Embryonal Trypanosome Infection.**]—*Ibid.* [In Japanese. German summary p. 67.] [Bact. Inst., Med. Faculty, Imperial Kyushu Univ., Fukuoka, Japan.]

i. The author has succeeded by the intraperitoneal injection of trypanosome vaccines (*T. equiperdum*, *T. gambiense* and *T. brucei*) in producing, in mice, rats and guineapigs, a local immunity. This immunity is specific and finally passes into a general immunity. In the early stages the antibody content of the peritoneal fluid, the omentum or spleen extract, is much greater than that of the blood serum. No phagocytosis was noted in the peritoneum of the immunized animals. The animals in which the great omentum had been extirpated developed no local immunity; hence the author considers this structure plays a great part in the production of this local immunity. Local immunity was similarly demonstrated in subcutaneous tissue and in the anterior chamber of the eye in rabbits.

ii. Although repeated oral administration of dead trypanosomes did not produce immunity, the author found that a feed of living trypanosomes, whether sensitized with bile or not, protected against a subsequent abdominal infection. But general immunity cannot be produced in this way.

iii. The protein obtained by the addition of ammonium sulphate to a watery solution of trypanosomes (*T. gambiense*, *T. equiperdum* or *T. lewisi*) acts as antigen and produces antibodies when injected intravenously in large doses into rabbits. The rabbit immune serum exhibits specific reactions, especially agglomeration, against the trypanosomes. Nothing of the nature of antigen was obtained in ether-acetone extractions of trypanosomes.

iv. The author investigated the rise and fall of the protective power of the serum of rabbits immunized against trypanosomes and against dead trypanosome vaccines. In each case the protective substance appeared between the 5th and 7th day, and rose slowly until it reached its maximum on the 10th to the 14th day. The fall in each instance was slow (70 days), but slower after trypanosome immunization than after vaccination.

Rabbits immunized with dead trypanosome vaccine and which, after six months, had completely lost their defensive power, and mice which had survived five months after vaccination, still proved immune on inoculation with the homologous trypanosome. From these facts the author concludes that in trypanosomal diseases the animals, notwithstanding the loss of active defensive power, still possess an active immunity.

v. The result of the author's observations is that trypanosomes do not pass the healthy placenta from mother to offspring. Microscopic examination of placentas of infected animals showed heavy infections in the maternal vessels, but none in the foetal. Preparations of embryos and new-born offspring of infected mothers were always negative.

W. Y.

ZIMMERMANN (Gerhart). Ueber die trypanozide Wirkung des menschlichen Serums im Tierversuch und *in vitro*. [**The Trypanocidal Action of Human Serum in the Animal Body and *in vitro*.**]—*Zent. f. Bakt.* I. Abt. Orig. 1931. May 4. Vol. 120. No. 7/8. pp. 422-440. [30 refs.] [Inst. for Ship & Trop. Diseases, Hamburg.]

The author has repeated and confirmed the work of the reviewer and his colleagues on this subject [this *Bulletin*, Vol. 27, p. 237 and p. 804]. His conclusions are as follows:—

(1) The demonstration of YORKE, ADAMS and MURGATROYD that human serum exerts a direct trypanocidal action *in vitro* is confirmed. Human serum acts proportionately to its concentration.

(2) The hypothesis of ROSENTHAL and his colleagues, based on the repeated prophylactic treatment of mice with human serum before infection, that the trypanocidal action of human serum is indirect, has, as the result of further work, been found to be untenable.

(3) In icterus and liver disease the trypanocidal power of the serum is not completely lost, but only diminished so that the hypothesis of YORKE regarding the possibility of transmissibility of normally non-pathogenic trypanosomes to man is not supported by this work.

[Reference to Zimmermann's experiments on this subject shows that he worked with the serum of 6 cases of either catarrhal jaundice or of cirrhosis of the liver and with one case of pernicious anaemia. In each of the liver cases the trypanocidal action of the serum was greatly reduced. This subject has frequently been investigated by the *in vivo* method and the general results agree with those obtained by the reviewer and his colleagues in their *in vitro* experiments, viz., that in certain grave diseases of the liver the trypanocidal power of human serum may be completely lost.]

W. Y.

TRAUM (E.) & LINDEN (H.). Beitrag zur Frage der Genese der trypanociden Serumkörper beim Menschen an Hand klinischer Beobachtungen. [**The Genesis of the Trypanocidal Substance of Human Serum: a Communication based on Clinical Observations.**]—*Klin. Woch.* 1931. Aug. 8. Vol. 10. No. 32. pp. 1500-1501. [12 refs.] [Surg. Clinic & Hyg. Inst., Heidelberg.]

The authors commence their article with a mis-statement of fact when they write that the trypanocidal action of human serum is only manifest after injection of the serum into mice and that it is not demonstrable in the test tube. The reviewer and his colleagues have shown that the trypanocidal action of human serum is direct and is manifest in *in vitro* experiments and that the trypanocidal power is proportional to the concentration of human serum present; and their work has recently been confirmed by ZIMMERMANN [this *Bulletin*, Vol. 27, p. 804 and above].

It is pointed out that relatively little is known regarding the nature and genesis of the trypanocidal substance, but that there exists a considerable mass of evidence to show that it is in some way bound up with the integrity of the liver since in certain severe diffuse liver lesions there is a great decrease or even total absence of serum trypanocidal substance.

In fact, ROSENTHAL and his colleagues have used the trypanocidal substance as a test for liver function, and it is recognized that this test may be positive when the sugar test and Kunfi's tetrachlorophenolphthalein or tetraiodophenolphthalein tests may be negative.

Details of a case in point are given. In this patient, who on subsequent post-mortem examination was shown to be suffering from Laennec's cirrhosis, the Kunfi test was negative, whereas the serum trypanocidal substance test was positive in that it was found to be markedly decreased in amount.

In a second case—that of a 7-year-old child suffering from severe haemolytic jaundice—the serum trypanocidal substance was considerably decreased; but a month after splenectomy it had greatly increased. In a third case—an 11-year-old child suffering from traumatic rupture of the spleen—the trypanocidal substance was found to be present in moderate amount 14 days after splenectomy and to have increased on the 55th day.

The authors conclude that if the liver is the chief site of formation of the serum trypanocidal substance, the spleen and remainder of the reticulo-endothelial system are sites of secondary importance.

W. Y.

REGENDANZ (P.). Ueber das Fehlen trypanozider Stoffe im Liquor cerebrospinalis des Menschen. [**The Absence of Trypanocidal Substance from the Cerebrospinal Fluid of Man.**—*Zent. f. Bakt.* I. Abt. Orig. 1931. Feb. 23. Vol. 120. No. 1/2. pp. 89-93. [9 refs.] [Inst. for Ship & Trop. Diseases, Hamburg.]

Since there have hitherto been only a few, and rather inadequate, observations on this subject, the author re-investigated it. His conclusions are :—

1. Neither in health nor in disease can trypanocidal substance be recognized by animal experiments in the cerebrospinal fluid of man.

2. Whilst human serum exhibits distinct trypanocidal action in mice experiments when administered in such doses as 0.1 or 0.2 cc., cerebrospinal fluid when given in 20 to 100 times the amount exerts no influence on the disease in mice infected with *T. brucei* or *T. rhodesiense*.

W. Y.

WALLACE (James Montague) & WORMALL (Arthur). **Red-Cell Adhesion in Trypanosomiasis of Man and Other Animals. II. Some Experiments on the Mechanism of the Reaction.**—*Parasitology*. 1931. July. Vol. 23. No. 3. pp. 346-359. [15 refs.] [Human Trypanosomiasis Inst., Entebbe.]

The following summary is given :—

" 1. The red-cell adhesion phenomenon in trypanosomiasis of man and other animals, first described by Duke and Wallace (1930) and shown by these authors to be due to the presence in the blood of the infected animal of a substance (adhesin) which appears during the course of an infection, has been investigated further. Several strains of *T. rhodesiense* and *T. gambiense* have been used for this study.

" 2. Red-cell adhesion of this nature has been obtained with the red blood cells of primates only, thus confirming the earlier finding.

" 3. No relationship appears to exist between red-cell adhesion and isohaemagglutination, or other types of haemagglutination. The removal, by absorption, of the α and β isohaemagglutinins from a human adhesin serum of blood group 0, or the removal from a monkey adhesin serum of agglutinins for baboon, rabbit and guineapig red cells does not lead to the removal of the adhesin.

" 4. Centrifuging, *per se*, does not destroy to any appreciable extent the power of trypanosomes to adhere to red cells.

" 5. Trypanosomes which have been freed from plasma by centrifuging and subsequent washing with citrate-Ringer-glucose solution give good adhesion with human or monkey red cells when a fresh adhesin serum or plasma is used. Little or no adhesion is obtained with these washed trypanosomes however, if the adhesin serum is very old or if it has been previously filtered through a Berkefeld filter candle or if the adhesin serum or plasma has been heated at 56° C. for 30 minutes.

" 6. From this and other evidence the conclusion is reached that in addition to the red cells, trypanosomes and the adhesin some other factor (designated the 'X' factor) is necessary for red-cell adhesion.

" 7. This 'X' factor is present in the serum or plasma of humans, monkeys, baboons, rabbits and guinea-pigs and has properties similar to those of complement. It is removed, as is most of the haemolytic complement, when the serum is filtered through a Berkefeld filter, it is destroyed by heating at 56° C. for 30 minutes, and, like haemolytic complement, it is inactivated when the serum is subjected to the action of dilute ammonia for about 1½ hours. Filtration, heating at 56° C. for 30 minutes and dilute ammonia appear to have no significant destructive action on the adhesin.

" 8. The requirements for this red-cell adhesion phenomenon are (a) the red cells of a primate, (b) an adhesin, which is probably an antibody-like substance produced during infection with trypanosomes, (c) trypanosomes of a strain related to that which gave rise to the formation of the adhesin, and (d) a complement-like component ('X' factor) present in the plasma and serum of most, if not all, normal animals."

W. Y.

BRUSSIN (A. M.) & KALAJEV (A. W.). Die Bedeutung des Komplements und der Blutplättchen für die Feststellung der Thrombozytobarine. XXII. Mitteilung. [**The Significance of the Complement and Blood Platelets for the Demonstration of the Adhesion Phenomenon.**]*—Ztschr. f. Immunitätsf. u. Experim. Therap.* 1931. Vol. 70. No. 5/6. pp. 497–521. [15 refs.] [Microbiol. Research Inst., Education Commissariat R.S.F.S.R. Moscow.]

The following summary is given :—

1. The chief factor necessary for regular results with the adhesion phenomenon is the quantity and quality of the complement.

2. The choice of blood platelets is determined by the complement which is employed, since, in order to obtain regular reactions, it is necessary to use complement and blood platelets from the same species of animal.

3. Washed platelets from the mouse cannot serve as indicators because their properties are changed by centrifuging and washing.

4. Accordingly, in order to ensure the appearance of the phenomenon, the method of Brussin and Belezki must be employed, i.e., the use of citrated blood of a normal mouse or citrated plasma of a guineapig, which furnishes both complement and platelets.

5. The use of various bacteria instead of platelets likewise suffices for a "loading" of trypanosomes and spirochaetes.

6. This loading occurs not only in the presence of specific serum, but also frequently in its absence.

7. Loading in the absence of specific serum is frequent in the case of certain bacteria (*B. coli comm.*), but rare in the case of others (*V. cholerae asiat.*).

8. Indeed with a culture of *V. cholerae asiat.*, it is not always possible to differentiate spirochaetal sera from trypanosomal sera.

9. These observations indicate the unsuitability of bacteria as indicators for the adhesion (loading) phenomenon.

10. Spirochaetes killed by heat can serve as antigen and give rise to the formation of thrombocyto-barin in the serum of animals.

W. Y.

CORSON (J. F.). **Experimental Infection of Antelopes (Dik-Dik) with *Trypanosoma rhodesiense*.**—*Ann. Trop. Med. & Parasit.* 1931. Aug. 13. Vol. 25. No. 2. pp. 211–214. [2 refs.]

A number of experiments were made at Maswa, Tanganyika Territory, by direct inoculation of *T. rhodesiense* into small antelopes, called dik-dik, caught in a fly-free area.

The following are the conclusions and comments :—

“Four antelopes, dik-diks, were inoculated with *T. rhodesiense* and proved to be readily susceptible. Trypanosomes were numerous in the blood and posterior nuclear forms were present. The lymphatic glands became enlarged but gland puncture showed no trypanosomes. No evidence was obtained of infection of the central nervous system. The animals appeared to suffer little in general health during a period of about one month. In sheep and goats severe wasting is soon evident and numerous leucocytes and trypanosomes can be found in the cerebro-spinal fluid, often within a month from the date of inoculation. It does not appear that even selected resistant sheep may be used in experiments to represent antelopes as regards the question of a reservoir as the objection that sheep are not antelopes is unanswerable. These experiments were made mainly to see if the central nervous system became infected; circumstances unfortunately curtailed the period of observation. No attempt was made to observe closely the behaviour of the trypanosomes in the antelopes.

“Observations over a longer period and under better health conditions than were possible at Maswa and on a larger number of animals are needed. Transmission by tsetse flies is of course required to get a closer resemblance to what may occur in Nature.”

W. Y.

CORSON (J. F.). **Hyra as a Possible Reservoir of *Trypanosoma rhodesiense*.**—*Jl. Trop. Med. & Hyg.* 1931. July 15. Vol. 34. No. 14. pp. 213–214. [1 ref.] [Sleeping Sickness Research Lab., Tinde, Tanganyika.]

Six specimens of hyrax caught on the rocks at Tinde, a fly-free area, were inoculated with *T. rhodesiense*. All became infected, the incubation period being usually 4 days. Trypanosomes were easily found in blood films, frequently several parasites being noticed in a field. Eight of the animals remained in apparent good health for more than a month. Subinoculation of rats was successful. Experiments showed that tsetse attacked hyrax in captivity readily.

The article concludes as follows :—

“*Comments.*—Hyra is often seen in considerable numbers on rocky hills during the daytime, especially in the late afternoon and evening. Both

G. morsitans and *G. swynnertoni*, especially perhaps the former, attack man eagerly about this time. It seems probable therefore that hyrax is an animal on which they feed and, as it is so susceptible to infection with *T. rhodesiense*, the question of its serving as a reservoir of *T. rhodesiense* in sleeping sickness areas seems to be worthy of further investigation."

W. Y.

CORSON (J. F.). **Direct Infection of Native Fowls with *Trypanosoma rhodesiense*.**—*Jl. Trop. Med. & Hyg.* 1931. Apr. 15. Vol. 34. No. 8. p. 109. [2 refs.]

Five native fowls (Tanganyika) were inoculated in the muscles of the leg with blood of white rats infected with three strains of *T. rhodesiense*. Two fowls became infected. Trypanosomes were not seen in their blood but were transmitted to white rats in which they multiplied rapidly and showed posterior nuclear forms. The period of the fowls' infectivity was at least six weeks; they showed no impairment of health. The author suggests that these creatures might initiate an epidemic in man. [BRUCE, HAMERTON & BATEMAN (1911) in experiments involving 13 fowls and 1820 *G. palpalis* failed to obtain any evidence that the Uganda fowl could serve as a reservoir for *T. gambiense*.]

A. G. B.

CORSON (J. F.). ***Trypanosoma rhodesiense* in the Cerebrospinal Fluid of Sheep and Goats.** [Miscellanea.]—*Ann. Trop. Med. & Parasit.* 1931. Mar. 31. Vol. 25. No. 1. p. 145.

In the late stages of infection sheep and goats show nervous symptoms. Three goats and two sheep were killed by chloroform and the cerebrospinal fluid withdrawn by suboccipital puncture. Trypanosomes and a greatly increased cell count were found in all.

W. Y.

LE GAC (P.). **Immunité observée chez *Cercopithecus lasiopyga petaurista* à la suite d'inoculation de *Trypanosoma gambiense*.** [Immunity in *Cercopithecus* sp. following inoculation with *T. gambiense*.]—*Bull. Soc. Path. Exot.* 1931. May 13. Vol. 24. No. 5. pp. 372-374.

Details are given regarding two *Cercopithecus lasiopyga petaurista* which were inoculated from human beings infected with *T. gambiense*. Trypanosomes appeared in the blood 40 and 45 days respectively after inoculation. In both animals the disease ran a severe course lasting 6 weeks to 2 months. Recovery then occurred and both animals were apparently immune to re-infection.

W. Y.

DAVIS (L. J.). **Experimental Feline Trypanosomiasis with Especial Reference to the Effect of Splenectomy.**—*Ann. Trop. Med. & Parasit.* 1931. Mar. 31. Vol. 25. No. 1. pp. 79-90. With 2 text figs. [20 refs.] [Wellcome Trop. Research Labs., Khartoum.]

As it has been shown that in domestic cats preliminary splenectomy exercises a most profound influence in aggravating the course of

experimental piroplasmiasis (Davis, 1929), it was considered to be of interest to observe the effect of removal of the spleen on a subsequent trypanosome infection in the cat.

The following summary is given :—

" 1. Experimental *T. brucei* and *T. rhodesiense* infections have been observed in a small number of cats, some of which had been previously splenectomized.

" 2. Both strains of trypanosome produced sub-acute infections fluctuating in intensity and of variable duration.

" 3. The average survival period of the splenectomized cats did not differ significantly from that of the normal controls. The number of trypanosomes in the peripheral blood shortly before death appeared to be significantly higher in the splenectomized cats.

" 4. *T. rhodesiense* infections in normal and in spleenless cats inoculated by the intra-peritoneal route were compared with those in a similar series inoculated subcutaneously. No significant difference was noted in the duration or intensity of the infections in the two series.

" 5. Taliaferro's statistical method of analysing the nature of the resistance of the host was applied to the study of *T. rhodesiense* infections in a normal and in a splenectomized cat. In both cases the coefficient of variation indicated a state of continued reproductive activity of moderate degree."

W. Y.

DUBOIS (A.). Au sujet du métabolisme des trypanosomes. [**The Metabolism of Trypanosomes.**]—*Ann. Soc. Belge de Méd. Trop.* 1930. Dec. 31. Vol. 10. No. 4. pp. 445-448. [6 refs.]

The author summarizes briefly previous literature showing that trypanosomes utilize in their metabolism various sugars and alcohols. It appeared to him to be of interest to enquire whether these parasites can make use of monatomic alcohols, particularly ethyl alcohol. An account is given of the technique; this did not differ essentially from that of previous workers. It was found that ethyl and methyl alcohols neither prolonged the life of the trypanosomes nor reanimated them as does glucose (Schern's phenomenon). Inositol likewise was without action: although this substance has the formula $C_6H_{12}O_6$, it is not a sugar, but a cyclic derivative found in muscle and of unknown significance.

W. Y.

MILLER (John W.). Chagas' Disease in Panama: Report of Three Cases.—*Southern Med. J.* 1931. July. Vol. 24. No. 7. pp. 645-647. [3 refs.]

The following summary is given :—

" (1) Three cases of Chagas' disease are reported, found for the first time in the Republic of Panama. All came from one focus in the basin of the Chagres River.

" (2) The trypanosomes found in the three cases are believed to be *T. cruzi*.

" (3) The trypanosomes disappeared spontaneously from the peripheral blood films without the action of any specific drug in the course of a few weeks. No opinion will be ventured regarding the final outcome of the attacks in these three children.

" (4) The symptoms and physical signs of Chagas' disease presented by these cases were essentially negative."

W. Y.

COLLIER (W. A.). Ueber Immunität bei der Chagaskrankheit der weissen Maus. [**On Immunity in Chagas' Disease in White Mice.**]—*Ztschr. f. Hyg. u. Infektionskr.* 1931. Jan. 15. Vol. 112. No. 1. pp. 88–92. [2 refs.] [Robert Koch Inst., Berlin.]

Mice were infected with a strain of *T. cruzi* which had been weakened by previous treatment with trypaflavin. After intervals varying from 83 to 134 days the surviving animals were injected with the normal strain and watched for a further period of two months. They either remained negative or at most showed in their blood an occasional parasite.

There was thus produced not a sterilizing immunity, but a labile infection with immunity against superinfection. The immunity was not transmitted to the young either through the placenta or through the milk.

W. Y.

MAZZA (Salvador), ROMAÑA (Cecilio) & SCHÜRMANN (Krimhilda). Nuevas observaciones sobre la infección espontánea de armadillos del país por el *Trypanosoma cruzi*. Hallazgo de este flagelado en *Dasybus novemcinctus*. Lin. del Chaco santafecino. Cuarta nota. [**Spontaneous Infection of Local Armadillos by *T. cruzi*. Its Presence in *Dasybus novemcinctus*.**]—*Prensa Méd. Argentina*. 1931. Feb. 28. Vol. 17. No. 27. pp. 1350–1357. With 8 text figs. [12 refs.]

The finding of *Dasybus novemcinctus* in the Argentine spontaneously infected with *T. cruzi* has been recorded previously (see this *Bulletin*, Vol. 27, p. 839); the author states however that, in many instances at least, the armadillo was not this species, but *Chaetophractus vellerosus vellerosus* (Gray), the identification having been faulty. He gives a list of the synonyms which have been given to *Dasybus novemcinctus*, Lin., 1758 down to 1905, fourteen in number, sufficient to satisfy the most ardent systematist. Nevertheless, this species does harbour the parasite, which was found in 2 out of 7 examined in Chaco and was transmissible to white rats and dogs. The *Chaetophractus* is a reservoir host in Jujuy, the *D. novemcinctus* being found infected once only in 150 examined in this district, but in Brazil, according to CHAGAS *D. novemcinctus*, *D. sexcinctus* and *D. unicinctus* are all found infected.

H. H. S.

BONACCI (Humberto). Nouveaux milieux de culture pour le *Trypanosoma cruzi*. [**New Culture Media for *T. cruzi*.**]—*C.R. Soc. Biol.* 1931. June 19. Vol. 107. No. 20. pp. 747–748.

The author has attempted to discover nutrient media more suitable for the culture of *T. cruzi* than are N.N.N., Noguchi's medium, Gaillard's medium and bouillon. He states the following three formulae have given satisfaction :—

Formula 1.—To 100 cc. of 1 per cent. gelatine melted at 50° C. and containing 1.5 gm. of peptone is added 1 cc. of a 50 per cent. solution of glucose and 5 cc. of the blood of a young guinea-pig. This medium is distributed in tubes which are slanted until it solidifies.

Formula 4.—Gelatine with 2.5 per cent. of peptone and 0.7 per cent. of sodium chloride. To this is added 1 cc. of a 50 per cent. solution of glucose

and 5 cc. of the blood of a young guineapig. Slants are made as in Formula 1.

Formula 9. As the previous, except that the proportion of peptone is 3 per cent. W. Y.

WALLACE (J. M.). **Micro-Organisms in the Gut of *Glossina palpalis*.**—*Ann. Trop. Med. & Parasit.* 1931. Mar. 31. Vol. 25. No. 1. pp. 1-19. [20 refs.] [Human Trypanosomiasis Inst., Entebbe.]

CARPENTER (1912) described an apparent incompatibility between trypanosomes and "certain long bacilli" present in unstained preparations of the gut of *G. palpalis*; and PRATES (1928) observed the same thing. The author has re-examined the matter and has reached the conclusion that the bacteria noted by CARPENTER and PRATES are undoubtedly the "bacteroids," "symbionts" or "symbiotes" described by STUHLMANN (1907) and later by ROUBAUD (1919).

The distribution of the bacteroids is limited, and they are easily missed in teasing-up the gut in the course of an ordinary dissection. They are "limited to a small portion, 3-4 mm. long, at the posterior end of that part which is relatively straight and narrow and is usually free from obvious blood." As noted by WIGGLESWORTH, the zone of giant cells containing bacteroids is far more localized than indicated by ROUBAUD; under favourable conditions it can be seen with the naked eye as an opaque patch which, with a hand lens, appears as an elongated white ring.

The author summarizes his work as follows:—

"1. Experiments are described which show why certain observers, who recorded the presence of 'long bacilli' in the gut of approximately 20 per cent. of wild *G. palpalis*, did not find these bacilli in every fly.

"2. Reasons are given for considering these 'long bacilli' to be identical with the intra-cellular bacteroids present in every fly, and therefore the incompatibility which these workers believed to exist between the 'long bacilli' and trypanosomes, is shown to be apparent only and due to the methods used in demonstrating the bacilli.

"3. Attempts were made to cultivate the bacteroids on various media though without success.

"4. 'Clean' laboratory-bred flies were fed on blood infected with known bacteria and the bacteria afterwards recovered in cultures from the gut of the flies. The duration of the 'infection' is shown to vary with different organisms and with some a point was reached when no further positive cultures were obtained. The longest time an 'infection' remained in a fly without killing it was thirty days.

"5. Evidence is given to show that tsetse-flies do not pick up bacterial infection even from grossly contaminated surroundings. The extreme cleanliness of the cages sometimes advocated in transmission experiments is therefore not essential.

"6. Cultures from numbers of flies show that during life the gut is apparently free from micro-organisms other than the bacteroids."

W. Y.

HORNBY (H. E.) & BAILEY (H. W.). **Diurnal Variation in the Concentration of *Trypanosoma congolense* in the Blood-Vessels of the Ox's Ear.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1931. Mar. 13. Vol. 24. No. 5. pp. 557-564. [3 refs.] [Vet. Lab., Mpwapa, Tanganyika.]

The following summary is given:—

"(1) It can be shown that the normal distribution of *T. congolense*

within the blood vessels of its mammalian host is most uneven, the concentration being much higher in capillaries than in arteries and veins.

"(2) In the ear the average concentration of trypanosomes throughout the vessels is inversely proportional to the amount of blood passing through in unit time, i.e., to the temperature.

"(3) This is reflected in blood-smears made from the ear veins, there being usually many more trypanosomes in the early morning than at midday.

"(4) Advantage of this knowledge should be taken in routine diagnostic procedures, and also when using blood-smears to measure the trypanocidal action of drugs."

W. Y.

MANSON-BAHR (P.). **The Epidemiology of Human Trypanosomiasis at the Present Time.**—*Proc. Roy. Soc. Med.* 1931. May. Vol. 24. No. 7. pp. 837-845 (Sect. Epidem. & State Med. pp. 25-33).

This is a general account of the subject and presents no new facts; it calls for no special notice here.

W. Y.

BROWNING (C. H.), COHEN (J. B.), ELLINGWORTH (S.) & GULBRANSEN (R.). **The Antiseptic and Trypanocidal Action of Certain Styryl and Anil Benzthiazole Derivatives.**—*Proc. Roy. Soc. Ser. B.* 1931. Apr. 2. Vol. 108. No. B 755. pp. 119-129. [5 refs.] [Med. School, Leeds; Path. Dept., Univ., & Western Infirmary, Glasgow.]

This paper is of a technical nature and should be consulted in the original by those interested.

W. Y.

CAMPOS (Ernesto de Souza). Une contribution de plus à l'étude de la transmission intra-utérine expérimentale du *Trypanosoma cruzi*.—*Bol. Soc. Med. e Cirurg. de S. Paulo.* 1930. Sept. Vol. 14. No. 7. [Summarized in *Rev. Sud-Américaine de Med. et de Chirurg.* 1931. June. Vol. 2. No. 6. p. 646.]

NÁJERA (L.). Sobre el tratamiento de la ceguera atóxica en los tripanosomiasis.—*Medicina Países Cálidos.* Madrid. 1931. Mar. Vol. 4. No. 2. pp. 104-107.

NÁJERA (L.). Observaciones sobre la valoración relativa de la triparsamida y del Bayer 205. Replica a los Drs. García Chico y Zschucke.—*Medicina Países Cálidos.* Madrid. 1931. July. Vol. 4. No. 4. pp. 299-314. [46 refs.] French summary (8 lines).

REGENDANZ (P.). Zur glykopriiven Intoxikation bei der Trypanosomiasis usw. Erwiderung auf die vorstehenden Ausführungen des Prof. Schern.—*Zent. f. Bakt.* I. Abt. Orig. 1931. Jan. 20. Vol. 119. No. 5/6. p. 303. [1 ref.]

SCHERN (Kurt). Zur glykopriiven Intoxikation bei der Trypanosomiasis etc. Erwiderung an Regendanz.—*Zent. f. Bakt.* I. Abt. Orig. 1931. Jan. 20. Vol. 119. No. 5/6. pp. 297-302.

YAWS AND SYPHILIS.

BLACKLOCK (D. B.). **Report on a Survey of Human Diseases in the Protectorate of Sierra Leone. Part I—Northern Provinces. Part II—Central and Southern Provinces.**—44 pp. 1930. Free-town.

In this interesting medical survey (which has been summarized elsewhere in this *Bulletin*), there are a number of references to yaws which it has been thought worth bringing together here; they have been put in tabular form.

	Northern Province.	Central and Southern Provinces
Duration of survey ...	5½ months ...	12 months.
Population examined ...	4,337 ...	5,153.
Yaws incidence (disease present or past)	In 24.7 per cent. ...	In 54 per cent.
Age incidence ...	Large proportion in children	Large proportion in children.
Primary lesion in 395 cases situated	Upper extremity 26 per cent. Lower extremity 54 per cent. Trunk, 13 per cent. (9 cases primary yaw occurred on penis) Head and neck, 7 per cent.	
Ainhum ...	3 male and 8 females, 10 of whom gave a history of yaws	7 males and 6 females of whom 6 males and 5 females gave history of yaws.
Goundou ...	2 cases, both females—history of yaws	5 cases, all males with a history of yaws.
Ganglion ...	4 cases ...	15 cases.
Arthritis ...	A large number of cases seen but etiology not ascertained	
Juxta-articular and subcutaneous nodules	306 among 2,904 persons	169 cases among 5,153 persons.
Subcutaneous nodules	The majority of the cases seen were apparently swellings due to <i>Oncocerca</i> infections and no differentiation of the true J.A.N. due to yaws or syphilis was made	
Lesions of the soles of the feet including "tender feet." Said to be a sequela of yaws		1,339.
Sabre tibia ...		38 cases, history of yaws in 31.
Gangosa...	64 cases among 2,924 persons	16 cases among 5,153 persons.

Although it is noted that a large proportion with sabre tibia gave a history of yaws the author does not seem to recognize that sabre tibia is a common lesion in yaws as he suggests it may be used as an index to gauge the incidence of congenital syphilis. It is worthy of note that among the population of 5,153 a single case exhibits a condition which

has been labelled "Hutchinson's teeth"; it would be interesting to hear more about this case.

The following further observations were made upon the 64 cases of gangosa occurring in the Northern Province:—

Sex and age incidence in 59 cases	0-10	...	3 male	...	1 female
	10-20	...	3	...	10
	21-30	...	8	...	15
	31-40	...	4	...	6
	41-50	...	1	...	7
	51-60	...	0	...	1

Nose alone affected	} (61 cases)	...	...	10	...	16
Mouth " " "		...	...	2	...	6
Nose and mouth " "		...	...	6	...	21

Positive history of yaws	} (53 cases)	...	...	14	...	32
Negative history of yaws		...	...	3	...	4

The lesion called gangosa was commonly associated with other lesions: the site of the first lesion and duration are given below as cited by the patient in 63 cases:—

Site.	Number of cases.	Duration in years.	
		Minimum.	Maximum.
Nose	24	9/12	20
Mouth, throat	9	1	12
Forehead	1	—	14
Ear	2	2	10
Malar region	1	—	4
Breast	3	2	3
Ribs	1	—	10
Clavicle	1	—	5
Arm	1	—	5
Elbow	1	—	8
Forearm	1	—	3
Hand	2	3	5
Iliac crest	1	—	25
Penis	1	—	1
Groin	2	6	8
Buttock	1	—	5
Knee	1	—	4
Leg	3	10	20
Ankle	3	9	10
Foot	4	2	20

It was observed that the ulceration process spreading from the angle of the mouth or nose invaded the cheek.

Deformation of eyelids, corneal opacities, keratitis, cataract, sabre tibia, absorption of small bones of fingers and toes so that the nail might rest on the metacarpal or metatarsal bones, were noted; gummatous swellings near joints were seen but joint seldom involved; lesions of the soles of the feet were few and mild.

H. S. Stannus.

KNOTT (James). **Yaws in Liberia.**—*Porto Rico Jl. of Public Health & Trop. Med.* 1931. June. Vol. 6. No. 4. pp. 385-390. With 6 figs. on 2 plates. [5 refs.] [Firestone Plantations, Liberia, W. Africa.]

The author considers yaws the most prevalent disease in Liberia and one causing more disability than any other. It is contracted in childhood and though the eruption may disappear after some months the disease remains latent during life causing stunting of growth, malnutrition and premature ageing. The lesions occurring among this people are those commonly seen in other endemic centres. The macular patches made up of minute papules were noted among the florid lesions. No lesion of mucous membrane nor iritis was seen. Gangosa, destructive joint lesions and periosteal nodes with bone pain were common. Crab yaws was very prevalent. Three cases of goundou in boys were seen, and juxta-articular nodules are common. Thickening of the skin of the palms of the hands and lichenification with depigmentation were also observed.

The author also refers to ganglion-like tumours about the tendons of the wrist and foot. "They consist of clusters of yellowish lobulated grain-sized masses of tissue adherent to fibrous trabeculae which arise within the tendon and emerge between its fibres."

Interstitial keratitis, cataract and optic atrophy were seen due to yaws lesions [but it is not quite clear what is meant]. Another lesion suspected as due to yaws was annular stricture just within the sphincter of the anus, which readily yields to treatment. Syphilis was not recognized to exist among this native population.

H. S. S.

LAMBERT (S. M.). **Yaws Incidence in the South Pacific.**—*Jl. Trop. Med. & Hyg.* 1931. May 1. Vol. 34. No. 9. pp. 117-122. With 1 text fig. [2 refs.]

A paper dealing with the incidence of yaws in the South Pacific Islands. The disease has certainly existed among these populations for some centuries. Formerly the entire population became infected. Syphilis is rare among these peoples as evidenced by the absence of chancre or scar of chancre among many thousands of natives of the various island groups examined [such evidence is, of course, by no means conclusive]. Dr. HARPER has only heard of two instances of the occurrence of syphilis in natives—one a Fijian male who contracted the disease from an Indian woman and it is interesting to note that he showed scars of yaws contracted in childhood and had suffered some late manifestations; the other a Solomon Islander who contracted syphilis on Rennell Island; in this case it may be inferred that he too had had yaws. Rennell Island, it is noted, is almost completely isolated and though yaws was found there last year nothing is noted as to the presence of syphilis. No other cases have been seen among natives by medical men though syphilis is extremely prevalent in the Indian communities of Fiji and the Asiatics in some other groups. The clinical characters of the disease are given as described by Dr. MONTAGU in the Annual Medical Report, Fiji, 1908, with special reference to the fact that a very large proportion of those treated at hospitals consisted of older children and adults suffering from lesions

which could not be distinguished from tertiary syphilis; common are crab yaws and a rather rapidly spreading ulcerative nodular lesion which may cover large areas of skin with cicatrization in its wake and also involve mucous membranes. Periosteal nodes are also common and indurated masses in the body of a muscle and in the tongue are described as due to yaws—they disappeared under iodides. During the past 20 years, of 182 Melanesians and Polynesians admitted, 42 had died of G.P.I.; "none of this number had syphilis." Aneurism and aortic disease are common.

The second half of the paper deals with figures and some of the results of campaigns directed against yaws; treatment was by salvarsan.

H. S. S.

TODD (K. Waller). **Halarsol in Yaws.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1931. June 30. Vol. 25. No. 1. pp. 65–74. [9 refs.]

A paper announcing results obtained by the author in 1929 and in 1927 (with Dr. CHESTERMAN).

The maximum dose which does not cause vomiting was considered to be the best; this was apparently about 4 cc. of a 2·5 per cent. solution given intravenously in adults and 1–2 cc. intramuscularly in very small children; the subcutaneous route is too painful to be practicable.

Note is made that the drug is liable to develop extreme toxicity on exposure after the ampoule is opened. The results of treatment extracted from this paper and put in tabular form are as follows:—

(C = cured; R = relapse; F = failure.)

Single injection series:

14	with secondary rashes followed for 6 months	11 C	3 R
10	" " " "	2 "	10 —
10	" late secondaries " "	6 "	4 6 F

Two injection series:

13	with secondary rashes followed for 6 months	11 C	2 R
13	" crab yaws " "	3 "	9 4 F
10	" hyperkeratosis " "	5 weeks	8 2 F
4	" tertiary ulcers " "	3 months	3 1 F

Three injection series:

21	with late secondaries	13 C	8 F
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No serious accident occurred though 1,731 injections were given. The W.R. in 4 cases became negative after 1, 2, 3 and 3 injections; in two cases it remained positive after 3 and 6 injections.

The author considers that Halarsol "may be the drug of election for rapid sterilization of yaws" [a claim that the reader will not consider justified].

H. S. S.

VAN NITSEN. Le pian congenital. [**Congenital Yaws.**]—*Ann. Soc. Belge de Méd. Trop.* 1930. Dec. 31. Vol. 10. No. 4. pp. 482–486.

The author comments on the paucity of facts suggesting that yaws may be inherited, and in recent literature has only seen those articles by BANDGAPADHYAY, LEON, WILSON and MATHIS summarized in a previous number of this *Bulletin*. He supports the view therein

expressed by the reviewer that the evidence produced did not in any way support the thesis that heredo-yaws occurred. His own experience leads him to state categorically that a woman with a history of past yaws or with signs of active disease never gives birth to a child with yaws. A child is never born possessing an immunity to yaws. On every occasion that a child has exhibited any stigmata, a syphilitic infection has been traceable.

H. S. S.

DEIBEL (H. Kellermann) & ELKBACH (E. M.). Lichen framboesiacus (pian dartre). [**Framboesial Lichen.**—*Geneesk. Tijdschr. v. Nederl. Indië*. 1931. July 1. Vol. 71. No. 7. pp. 675-689. With 7 figs. (4 coloured) on 6 plates. [29 refs.] [Military Med. Hosp., Batavia, Java.]

A detailed description of this micropapular eruption which is a very typical secondary manifestation in yaws. The differential diagnosis from other lichenoid affections (lichen pilaris, syphiliticus, scrophulorum; lichen ruber acuminatus, nitidus and trichophyticus) is dealt with in detail. The eruption consists of disseminated areas of depigmented keratotic micropapulae arising from the hair follicles.

Histologically slight infiltration, but marked hyperkeratosis and depigmentation are the characteristic features. From an anatomopathological point of view, this picture is nearly pathognomonic.

W. J. Bais.

FAST (G.). Oogziekten bij framboesia tropica, naar aanleiding van een geval van neuroretinitis. [**Eye Diseases in Yaws; a Case of Neuroretinitis.**—*Geneesk. Tijdschr. v. Nederl.-Indië*. 1931. Apr. 1. Vol. 71. No. 4. pp. 361-372. With 13 text figs. [12 refs.]

A Javanese woman of 20 during pregnancy suffered from an acute neuroretinitis of the right eye. Within a week of the first administration of arsphenamine the progress of the affection was arrested and considerable improvement followed during further treatment; yet an important defect of the optic field remained. The patient had suffered from yaws 17 years before and showed typical scars of this affection. Syphilis could be excluded (absence of other syphilitic symptoms, birth of a healthy child, long latency of the disease, prompt reaction to arsphenamine, negative Wassermann test in the husband's blood), as well as other possible causes of retinitis (nephritis, tuberculosis). The author ascribes the affection to yaws and quotes the literature in regard to the connexion of eye diseases with yaws, arriving at the conclusion that such affections are apparently rare but might be observed more frequently if proper attention were paid to the possible aetiological connexion. Apart from dermal lesions round the eye, yaws may cause conjunctivitis, a certain type of pterygium, orbital periostitis, cyclitis, and iridocyclitis, parenchymatous keratitis and neuroretinitis.

W. J. Bais.

BROSIUS (O. T.). **Yaws—Case Reports.**—*Nineteenth Ann. Rep. Med. Dept. United Fruit Company, Boston, Mass.* 1930. pp. 108-109. With 1 text fig. [United Fruit Company Hosp., Almirante, Panama.]

A short note upon 4 typical cases of yaws seen at the Almirante Clinic, Panama, during the year. Only 12 cases have been observed during the 5 years past.

H. S. S.

*BUTLER (C. S.). **Diagnosis and Treatment of Yaws.**—Reprinted from *Internat. Clinics*. 1930. Ser. 40. Vol. 2. 14 pp. With 18 figs. (1 coloured) on 8 plates. [15 refs.]

The author starts with a definition of yaws from DE SAUVAGES (1763). From 1530 when FRACASTORO named syphilis down to SYDENHAM (circ. 1666) and on to the time of DE SAUVAGES there was apparently no question as to the identity of yaws and syphilis. After the last-named author "certain groups of symptoms were set off by the authorities and described under the name of yaws" and by 1803 this idea was well planted in the literature. Since then doctors have gone to the tropics educated to believe that yaws is distinct from syphilis. The supposed differences however "all vanish into thin air when brought into the spotlight of a critical interrogation."

The author proceeds by a "yaws catechism," a brief question and a detailed reply. To the question, If yaws is syphilis why is it not congenital?, he replies that it is, and that the statement that it is not is due both to insufficient observation and to the signs of congenital syphilis having been excluded by definition. The extra-genital position of the initial lesion is explained by its, as a rule, innocent acquirement. Among filthy people subject to overcrowding syphilis is predominantly innocent. For the same reason it is a disease of childhood, and the fact that it is a disease of childhood explains the relative infrequency of congenital yaws.

To the question why mercury does not cure yaws he replies that it does, giving a reference to HUNT and JOHNSON [*U.S. Nav. Med. Bull.* 1923, Vol. 18, p. 599. "Mercury internally has been thought to do good in some cases."]. The relative value of mercury, bismuth and the organic arsenicals in the treatment of trepanematoses is given as 4 to 7 to 10.

To the question why yaws fails to show vascular diseases and gummata of the internal organs he replies that it does.

To the question why yaws is not seen in temperate climates, he replies that it is seen, cases being not at all infrequently published at the present time. On the initial lesion and its difference from the Hunterian chancre OSLER is quoted to the effect that extragenital chancres are less likely to manifest induration and more given to phagedena and oedema. The author has, however, seen "several initial yaws lesions which showed the induration typical of the Hunterian chancre."

On the immunity question he says that yaws immunizes to syphilis both in man and monkey (SCHÖBL). He thinks, however, experimental animals will fail to convince us of the unity of the two diseases because none of them give reactions comparable to those of man in response to inoculations of the virus. JAHNEL and LANGE proved that in general paretics *T. pallidum* immunizes to *T. pertenue* [this *Bulletin*, Vol. 26. p. 175]. To the question why, if yaws is syphilis, there is so little tabes and G.P.I. among natives who suffer from yaws, the reply is that in syphilis-affected natives too these sequelae are rare.

He now defines yaws as "epidemic non-venereal syphilis transmitted innocently among primitive peoples" constituting under stone-age conditions of personal hygiene one of the exanthemata of childhood.

A. G. B.

* This paper has been already reviewed [*ante*, p. 439]. Captain Butler, however, considers that the former review was critical rather than informative, and that he was misrepresented in it. An attempt has therefore been made to summarize his paper without omitting anything that appears essential to his argument.

ARNAUD (A.), FORNARA, VIGONI & VAN HOOF. Syphilis et pian seraient-ils une seule et même affection ? [**Are Yaws and Syphilis Identical ?**]*—Bruxelles-Méd.* 1931. Apr. 19. Vol. 11. No. 25. pp. 722-735.

In reply to an enquiry formulated by the *Bruxelles-Médical* the opinions of doctors Arnaud, Fornara, Vigoni and van Hoof are now given upon the identity or otherwise of yaws and syphilis.

The first mentioned quotes some of the findings of other writers without adducing any new facts. Fornara alludes to the pitfalls in interpreting cross immunity experiments. He himself has seen clinical yaws developed in a man before infected with syphilis and *vice versa*, and has seen syphilis contracted by persons suffering from active and latent yaws. He believes the cerebrospinal fluid is always negative for W.R. in yaws. Vigoni produces geographical distribution as evidence: in Lusanga area of Kwilu where 100 per cent. natives were infected with yaws, white occupation has recently begun with the introduction of syphilis and this yaws-infected population shows no immunity to syphilis. Van Hoof deals with the lesions common in syphilis which are not seen in yaws.

H. S. S.

CONNOLLY (P. P. D.). **Do Yaws and Syphilis confer Immunity against Each Other, and if so to what Extent ?***—Kenya & East African Med. Jl.* 1931. Mar. Vol. 7. No. 12. pp. 345-348. With 2 diagrams on 1 plate.

The author was struck by the uneven and patchy distribution of yaws and syphilis in the various provinces of Kenya and attempts to find an explanation for this and for the fact that "where yaws is found in abundance syphilis is rare and *vice versa*." To this end he examined the numbers of admissions due to yaws and syphilis for Kikuyu and Kavirondo natives into the Infectious Diseases Hospital, Nairobi.

He found that "syphilis was five times more frequent among the Kavirondo than amongst the Kikuyu" and that "malignant syphilis was three times more common in the Kavirondo," and conversely "the yaws rate in the Kikuyu outnumbers that in the Kavirondo by nearly three hundred per cent. . . . Framboesia maligna in the Kikuyu is relatively common; in the Kavirondo it is absent." Dr. Connolly then says, "These figures if they do not prove an immunity between the two diseases at least strongly suggest it." Further, he has "only known about two cases where a patient having suffered from yaws has subsequently contracted syphilis" and he has "not come across a case where a patient having had syphilis had subsequently contracted yaws. The immunity between the two would seem to be of a high degree though it is almost certainly not absolute."

[While such speculations may be useful in helping others to keep an open mind, they must remain speculations pure and simple. The evidence adduced has no statistical value whatever. Dr. Connolly suggests that a preparation like luetin which might be called framboesin could possibly be prepared and might give interesting results. Actually such a preparation has been made and so named.]

H. S. S.

BURKE-GAFFNEY (H. J. O'D.). **The Clinical Value of the Combined Kahn and Wassermann Tests in the Tropics, with Special Reference to Yaws and Syphilis.**—*Jl. Hygiene*, 1931. Apr. Vol. 31. No. 2. pp. 215-224. [20 refs.] [Med. Lab., Dar-es-Salaam.]

Of the 500 sera tested the clinical condition was known in 448 cases. An exact agreement was found between the tests in 96.4 per cent. of all cases. The investigation proved the reliability of the Kahn test in the tropics and the keeping properties, at room temperature, of the only special reagent required in that test—cholesterinized antigen. It is recommended that when both tests are available they should be performed in parallel.

W. F. Harvey.

LACAPÈRE (G.). **L'influence du paludisme sur la syphilis chez l'Arabe.** [**Influence of Malaria on Syphilis in the Arab.**]—*Rev. Prat. Malad. des Pays Chauds*, 1930. Aug. & Oct. Year 9. Vol. 10. Nos. 8 & 10. pp. 386-388; 471-473. [1 ref.]

In view of the efficacy of malarial therapy in general paralysis many have speculated upon the possible part malaria may play in endemic areas upon the incidence and course of syphilis among natives. Dr. Lacapère during three years spent in Morocco has looked for evidence upon this question.

In the first place he quotes the case of an Arab woman who for several months suffered a rise of temperature to 39° C. each evening till four the following morning, of a typically quotidian malarial character, which ceased after the third injection of N.A.B., exhibited as the result of her blood and that of her husband giving a positive W.R. while she herself showed no symptoms of syphilis. This is a secondary syphilitic fever impressed with the character of a malarial intermittent pyrexia. [Blood apparently not examined for malarial parasites.] Apart from some similar observations malaria would appear to have no effect upon secondary syphilis. While GÉMY has affirmed that malaria has no effect on the virulence of syphilis, Lacapère believes that malaria is the principal cause of tertiary syphilis causing the markedly mutilating lesions in the skin and osseous system seen among Arabs. Ulcerative lesions of the skin form 60 per cent. of the tertiary skin conditions seen at Fez and bony lesions are about as frequent. The author believes that the malarial cachexia so common among these peoples causes an arterial hypotension, often so low as to suggest adrenal insufficiency, and that the stasis so engendered allows groups of spirochaetes to set up the necrotic lesions in the skin. At the same time the intense loss of red cells, almost suggesting a pernicious anaemia, puts such a strain upon the bone marrow that the bone falls a victim to the syphilitic virus.

FOURNIER showed that Europeans suffering from chronic malaria were liable to malignant extensive ulcerative lesions liable to become phagedenic and again that an attack of malaria would precipitate an explosion of ulcerative skin lesions and bone affections.

[Colonel HARRISON has supplied the following interesting comment :

"With regard to the possibility of malaria being the principal reason for tertiary syphilis causing severe mutilating lesions in Arabs, a case related by W. H. GOECKERMANN (*American Jl. Med. Sci.*, 1928, v. 175, 261) is interesting. A woman five months after malarial treatment of

G.P.I. developed a nodular cutaneous syphilide. The malaria had caused a complete remission of the G.P.I. GERSTMANN ('*Die Malariabehandlung der Progressiven Paralyse*,' 2nd Ed., p. 216) cites four cases reported by MARKUSZEWICZ, SCHULTZE, PFEIFFER and KIRSCHBAUM in which gummata developed after malarial treatment of G.P.I. and one in WAGNER-JAUREGG's clinic which developed a syphilitic arthritis. GERSTMANN, like GOECKERMANN, seems to favour the hypothesis that malarial treatment makes the supporting and vascular structures allergic.

"As to the immediate cause of syphilitic ulceration, in a recent paper by WILE, WIDER and WARTHIN (*Am. J. Syph.* 1930, v. 14, 1) relating a case in which innumerable ulcers occurred it was reported that microscopic sections showed the lesions to be due to severe endarteritis and closure of cutaneous vessels, resulting in necrosis of the tissues supplied. No spirochaetes were found in the necrosed areas, and WARTHIN regarded them as infarcts. It seems possible that fever may act in two ways: (1) as an agent which is noxious to and temporarily stimulates the spirochaetes to increased activity, on the Jarisch-Herxheimer principle and (2) by stimulating the defensive reaction of the body (allergy), including in this increased perivascular infiltration which results in closure of vessels and necrosis of parts supplied. As to (2) probably it is right to say that, in most cases, syphilis kills through the defence put up by the tissues."

The course run by a syphilitic infection is well known to be influenced by other factors. Women often show the first clinical sign of syphilis after the menopause and this fact may be due to the reduction, or stoppage, of ovarian hormones. The well-known mildness of syphilis in females is confined to the sexually active period, and another interesting fact is that syphilitic lesions have been found in the ovary only very rarely.

Lacapère also is among those who see in chronic malarial infections among natives a possible cause for the rarity of general paralysis among them. With regard to this theory, it is worthy of note that in certain races, NAGELSBACH (see *Bulletin of Hygiene*, 1926, p. 867) showed that neurosyphilis is unknown in parts of W. Abyssinia where syphilis is rife but malaria non-existent.]

H. S. S.

BRUNSTING (Louis 'A.). **Syphilitic Juxta-Articular Nodes.**—*Amer. J. Syph.* 1931. Jan. Vol. 15. No. 1. pp. 42-49. With 1 plate. [4 refs.] [Mayo Clinic, Rochester.]

The author gives the following summary:—

"Clinical and histopathologic descriptions are given of juxta-articular nodes occurring in the cases of three men who had never been in the tropics. Definite evidence of syphilis was present in each case; in two cases there was history of infection. The Wassermann reaction of the blood was uniformly positive. In two of the cases there were concomitant signs of visceral involvement: cardiovascular syphilis in one case, and cardiovascular and neurosyphilis in the other. Response to treatment for syphilis was surprisingly prompt and complete in the one case in which the juxta-articular nodes presented the only clinical sign of the disease. In the second case, the solitary nodule was excised for histologic study; in the third case sufficient time had not elapsed to permit of evaluation of response of the nodules to treatment. Microscopic evidence of syphilis was definite only in one case; in the other cases the cellular reaction was nonspecific."

In case one the lesions consisted of 7-8 discrete, firm, moveable, slightly tender, subcutaneous tumours a half to two centimetres in diameter distributed on the flexor surface of the fingers and palm of the right hand, unattached to skin or to tendons. These all practically disappeared in 6-7 months under intensive anti-syphilitic treatment.

The second patient presented a single subcutaneous tumour 2 cm. in diameter just below the left olecranon crest. A portion of the tumour was removed for investigation; the remainder disappeared under treatment.

The third patient showed on the palmar surfaces of the fingers of both hands numerous firm fibroid slightly moveable painless subcutaneous nodules $\frac{1}{2}$ –1 cm. in diameter and only apparent on palpation. Below the left olecranon also 3 small nodules were found: others had existed but disappeared spontaneously according to the patient.

"The histopathologic characteristics in the three cases herein described consisted essentially of ill-defined nodules of fibrosis in the middle part of the cutis and subcutaneous tissue, with a central zone of vascularity. The inflammatory reaction was chiefly perivascular in distribution and the infiltration consisted largely of lymphocytes and plasma cells. Proliferative changes in the blood vessels were not of marked degree. In only one case were the histopathologic changes of sufficient degree to warrant the diagnosis of syphilis on microscopic examination. In the other cases, the microscopic appearance was that of fibrosis with a cellular reaction, chronic inflammatory in character, and of a nonspecific type."

H. S. S.

FONTOYNONT (M.), GIRARD (G.) & WOLTZ (H.). Nouvelle conception pathogénique des "nodosités juxta-articulaires" des Malgaches, avec les déductions qu'elle comporte. [**New Pathogenic Conception of J.A.N. in Malagasies.**]—*Bull. Soc. Path. Exot.* 1931. Mar. 11. Vol. 24. No. 3. pp. 209–214. [1 ref.] [Pasteur Inst., Antananarivo.]

After referring to the still uncertain etiology of J.A.N., the authors remark upon the invariable presence of a white substance like zinc ointment in all the nodes when they show signs of softening, but before ulceration, that came under his notice at Antananarivo in Madagascar. This creamy substance contained few if any cellular elements but showed in earlier cases a tangled mass of needle-shaped crystals; in older cases which were harder to the touch the crystalline elements were absent and replaced by a more desiccated chalky paste. These contents of the nodes were all sterile on cultivation. In three cases [no clinical description given] small nodes were noticed on the pinna which immediately suggested tophi. These resembled in their histological picture the nodes on the limbs of the patients and the account originally given by JEANSEIME [no histological description given], and their contents macroscopically resembled the contents of the J.A.N. and proved on chemical analysis to consist of uric acid, cholesterin and salts (phosphates and chlorides of sodium, calcium and magnesium) in the proportions 56 : 13 : 21, but no tyrosin. It will be remembered that CAROUGEAU considered the crystalline deposits in J.A.N. to be tyrosin but it is possible his test did not distinguish between cholesterin and tyrosin.

The presence of uric acid suggested estimations of uric acid in the blood serum and these patients showed a figure around 12 cgm. per litre or three times the normal for Europeans, supporting the idea of a gouty diathesis for J.A.N. It was found, however, that the uric acid-urea ratio, normally 0.03 in Europeans, was among the general Antananarivo population 0.05 and that this same figure was true for the J.A.N. cases. Uric acid calculus is common, but blood cholesterol is low in Madagascar as among other races in the East.

In one case which came to necropsy a fistula was found leading down to a tuberculous left ankle joint (proved by guinea-pig inoculation).

The authors suggest that they have been dealing with cases of tubercular

infection with attenuated virus or a tuberculous "ultra-virus." They ask what part may a tuberculous infection play in the genesis of J.A.N. Is it an inconstant epiphenomenon? Is it a primary cause acting in the presence of a special soil?

H. S. S.

CLIMATIC BUBO AND LYMPHOGRANULOMA INGUINALE.

NAUMANN (H. E.). Der klimatische Bubo und seine Therapie. [**Climatic Bubo and its Treatment.**]*—Arch. f. Schiffs- u. Trop.-Hyg.* 1931. Mar. Vol. 35. No. 3. pp. 181-184.

The author relates the occurrence of six cases, all members of a ship's company who gained their infection from the same woman at the port of Jérémie (Haiti). All presented the now well-known penile lesion, in the first case three days after coitus. Gland enlargement occurred on the 6th day. All had fever and splenic enlargement. All investigations as to etiology were negative. Treatment consisted in solganol 0.01 to 1.0 gm. intravenously every second day. In the first, the earliest case, gland enlargement and penile lesion had disappeared on the 14th day of treatment. In the most advanced case and that having longest interval since infection, resolution was obtained in 6 weeks. They were all what might be called early cases and softening had not taken place in any nor did it take place subsequent to treatment being commenced.

The lady was then apprehended. She appeared to be in excellent general health. There were some small palpable glands in the inguinal regions. Leucorrhoeal discharge was abundant but negative for gonococci. No chancre present, but on the cervix there was an erosion, and the mucous membrane about the vaginal opening was covered with white spots.

In using solganol watch must be kept on the urine; albuminuria in some degree was always produced.

H. S. Stannus.

REZENDE (Motta) & SOBRINHO (J. Muniz). Iodurêto de sodio na linfogranulomatose inguinal sub-aguda. [**Sodium Iodide in Climatic Bubo.**]*—Arch. Brasileiros de Med.* 1931. Jan. Vol. 21. No. 1. pp. 1-5.

Intravenous injection of iodine in the treatment of this condition is not new, 10 cc. of Lugol's solution with an equal quantity of normal saline having been employed as a daily injection by RAVAUT. The authors, however, use the sodium salt, 10 cc. of a 10 per cent. solution, and regard it as specific.

They record the case of a man of 23 years with enlarged groin glands of some months' duration, with exacerbations and remissions. Various forms of treatment were unavailing, among them a course of neosalvarsan, the W.R. being positive. The first injection of the sodium iodide was followed by a rise in temperature to 40.3° C. (it had till then been fluctuating between 36.6° and 39° C.); this fell to 36° next day, rose to 36.6° for another 24 hours and then remained at 36° for the ensuing 6 days during which he was kept in hospital. The "swollen glands became markedly reduced after the injections and his general state improved considerably" state the authors, but unfortunately no mention is made of the number of injections given.

H. H. S.

FREI (W.) & WIESE (J.). Zur Behandlung der Lymphogranulomatosis inguinalis, insbesondere mit einem Kupferpräparat. [**Treatment of L.I. especially with a Copper Preparation.**—*Klin. Woch.* 1931. Feb. 28. Vol. 10. No. 9. pp. 404–406. [Municipal Hosp., Berlin-Spandau.]

The author has tried a copper preparation "Cuprasol H" in the treatment of L.I. 1.5 cc. of the solution as put up in ampoule up to 2.5 or 3.0 cc. may be given intravenously twice weekly or smaller doses more frequently. Watch must be kept on the albumin and bile pigments in the urine. Cuprasol is not very effective alone, but in conjunction with stibenyl gives good results. Every second day an injection is given, alternately cuprasol and stibenyl—8 to 10 of each, 3 to 4 weeks witnessing in most cases a cure.

H. S. S.

HELLERSTRÖM (Sven). Zur Kenntnis der Hautallergie beim Lymphogranuloma inguinale. [**Skin Allergy in Lymphogranuloma Inguinale.**—*Klin. Woch.* 1931. Mar. 28. Vol. 10. No. 13. pp. 595–597. [9 refs.] [Karolin Inst., Stockholm.]

FREI introduced his now well-known specific cutaneous test for L.I. at the end of 1925. Since then its use has been repeatedly demonstrated by various observers, chiefly in Germany and Scandinavia. The preparation of the antigen and method of performing the test, however, require care and various precautions must be taken if successful and correct results would be obtained. These are set forth in this paper and should be studied by all those interested since it cannot be summarized.

H. S. S.

LEVADITI (C.), RAVAUT (P.), LÉPINE (P.) & SCHOEN (R.). L'affinité d'un virus isolé de la lymphogranulomatose inguinale (maladie de Nicolas et Favre) pour le système lymphatique du singe. [**Affinity of Lymphogranuloma Virus for Lymphatic System of Monkey.**—*C.R. Acad. Sci.* 1931. June 15. Vol. 192. No. 24. pp. 1600–1602. [1 ref.]

Following their previous work by which an ultravirus had been demonstrated in man suffering from L.I., the authors have carried out researches to demonstrate its affinity for lymphatic glands in monkeys, animals which can be successfully inoculated as shown by HELLERSTRÖM and WASSÈN. Using as the inoculum an emulsion of brain substance from a monkey which had died seven days after subdural infection, injection into the inguinal gland of another monkey was followed by local swelling and a general polyadenitis. After an early diminution there was a recrudescence of signs on the twentieth day without symptoms of illness. Thirty-one days later a gland from the opposite inguinal region was excised, emulsified in isotonic saline and inoculated intracerebrally into a third monkey. After showing signs of paralysis of the limbs the animal died on the twenty-fourth day with P.M. signs of a meningo-encephalitis, but cultures were negative.

The histological changes in the glands of the second monkey were typical—marked endothelial proliferation of vessels with intense monocytic and basophilic infiltration.

H. S. S.

LEVADITI (C.), RAVAUT (P.), LÉPINE (P.) & SCHOEN (R.). Présence du virus de la lymphogranulomatose inguinale (maladie de Nicolas et Favre) dans les organes des singes inoculés par voie intracérébrale. [**Presence of Virus of L.I. in the Organs of Monkeys inoculated Intracerebrally.**]—*C.R. Soc. Biol.* 1931. July 3. Vol. 107. No. 22. pp. 959-961. [2 refs.]

Two papers by these authors have recently appeared in connexion with this work. In the present communication are given their findings as regards the presence of the ultra-virus in various organs of a monkey killed when in the last stages of an L.I. infection produced by intracerebral inoculation. Emulsions of various organs were inoculated intracerebrally into a number of clean monkeys. The liver, spleen, kidney, marrow, and lymphatic glands were demonstrated to contain the virus while the blood was negative. No changes are mentioned as occurring in these organs, but in all the animals the characteristic meningitis with perivascular lymphoid infiltration was produced.

H. S. S.

HELLERSTRÖM (Sven) & WASSÉN (Erik). Meningo-enzephalitische Veränderungen bei Affen nach intracerebraler Impfung mit Lymphogranuloma inguinale. [**Meningo-Encephalitis in Monkeys after Intracerebral Inoculation with L. I.**]—VIIIe Congrès International de Dermatologie et de Syphiligraphie, Copenhague 5 au 9 août 1930. 5 pp. With 9 figs. (8 coloured).

Intra-cerebral injection of suspensions of L. I. gland tissue 1:50 to 1:100 in physiological saline, after filtration through gauze, in doses of 0.04, 0.06, 0.08 cc. produced in Rhesus and Cynomolgus monkeys a meningo-encephalitis. The suspension was prepared from glands in typical cases of L. I. of 3 weeks' standing. After an incubation period of 6-12 days the monkeys became somnolent and later exhibited ataxia and clonic spasms. Some died after 6, 14 to 27 days; others were killed at similar intervals. Post mortem examination revealed a generalized lepto-meningitis involving cerebellum as well as cerebrum and was marked around the plexus and most in evidence in the sulci. Excellent coloured plates show the hyperaemia, the infiltration, especially perivascular with endothelial cells and polymorphonuclear leucocytes. Passage from monkey to monkey was successful to the 2nd in Rhesus but up to the 11th in Cynomolgus.

Intra-preputial inoculation was done in one monkey. In thirteen days the inguinal glands were enlarged to the size of peas and the cellular reaction found on section was similar to that in the brain and to that found in early cases in man.

The meningo-encephalitic changes resembled those seen in monkeys caused by vaccinia virus and therefore cannot be said to be specific but they are, there is strong ground to believe, caused by the virus of L. I. and this is borne out by the reactions carried out according to Frei's method. Attempts to demonstrate the virus microscopically or by cultural methods failed.

H. S. S.

LATKO (N.) & MICHAILOW (S.). Zur Ätiologie des Lymphogranuloma inguinale. [**Etiology of Lymphogranuloma inguinale.**]—*Dermat. Woch.* 1931. Mar. 7. Vol. 92. No. 10. pp. 349-353. With 4 text figs. [8 refs.] [Dermato-Venereal Clinic, 2nd Univ., Moscow.]

Writing from the clinic for skin and venereal diseases, Moscow, the authors describe a case of L. I. with fever and general symptoms—a 34-year-

old peasant from Njeshin, married 15 years, with history of gonorrhoea 3 years before but otherwise no venereal history previously and none in family: he denied recent extra-marital coitus. Five months before coming under observation he noticed a node on the prepuce which soon developed into a painful ulcer with hard edges, gray sloughy base and a small ring of inflammatory exudation around. Two weeks later the right inguinal glands swelled and in another week the left side was affected. When seen there were masses the size of eggs in each groin and masses of glands in each iliac region, the size of an infant's head on the right side, on the left side rather smaller, hard and painful to pressure.

Blood examination showed W. R. negative, R.C. 5,100,000; W.C. 5,500; Haemoglobin 65 per cent. Differential count about normal. Skin von Pirquet weakly positive. Ulcer and gland juice negative for Ducrey's bacillus or spirochaetes. Culture and inoculation into guineapigs negative for tubercle. By culture two organisms were isolated from gland puncture juice, one the hay bacillus, the other a diphtheroid avirulent to guineapigs. A vaccine was made from the latter and 22 injections given during the four months the patient took to get well.

The authors point out that the organism described by KITCHEVATZ and PETROWITSCH had practically the characters of the hay bacillus and though they do not wish to say that either organism is the cause of the disease they suggest the diphtheroid bacillus may in symbiosis play a part.

H. S. S.

BLACKWATER FEVER.

CONNAL (Andrew). **Figures relating to Blackwater Fever in Nigeria.**
Part I.—*West African Med. Jl.* Lagos. 1930. Oct. Vol. 4.
No. 2. pp. 32-39.

In this report information has been collected concerning 832 cases of blackwater fever notified in Nigeria between 1899 and 1929. Not any of the histories are complete and in some instances, especially during the earlier years, the data supplied are meagre. Most of the information was obtained from the patients themselves, much has been given by friends and fellow-workers, and some has been collected from Staff Lists and Gazettes. This paper, which constitutes the first part of the report, deals with the amount of quinine taken, and with the length of the interval elapsing between the last doses of the drug and the onset of haemoglobinuria. The patients are divided into three classes, viz., Class A, B and C.—

“ *Class (a).*—Those who professed to take quinine regularly as a prophylactic measure against malaria.

“ *Class (b).*—Those who admitted irregularity, such as ‘ usually daily,’ ‘ occasionally forgetting,’ or ‘ sometimes missing ’ taking the prophylactic dose of quinine.

“ *Class (c).*—Those who took no quinine, or seldom or rarely took it, or took it only when they were ill.”

Class A contains 130 cases, the dosage was usually 5 grains daily, but there were many exceptions. Connal remarks that although the dosage was regular it could not in all cases be regarded as sufficient for prophylactic purposes; and he adds that absolute regularity was not attained in every case, and that this class undoubtedly contains a number of cases which, had strict regard to the truth been observed by the patient, should properly have come into Class B.

Class B contains 172 cases and it may be accepted that practically in every instance the dose, which was taken irregularly, was one of 5 grains, with an occasional extra 5 grains added to make up for a lapse.

Class C contains 88 cases. Those who “ took no quinine ” numbered 35, those who took quinine “ only when ill ” numbered 28, those who took it “ rarely ” 13, and those who took it “ seldom ” 8.

Cases are also divisible into groups according to the amount of quinine taken. This and much other information is given in tables which it is impossible to summarize here and which should be consulted in the original by those interested.

Commenting on his statistics Connal states that it may be accepted that at least 70 per cent. of the Europeans resident in Nigeria, as in the other British West African Colonies, took 5 grains of quinine with regularity, usually daily, although on occasions a dose may be missed or the hour taking it altered.

As regards the influence of quinine in the causation or in the precipitation of blackwater fever, it is to be noted that 52 cases are recorded in which no quinine had been administered for a period of at least three days before the appearance of haemoglobinuria. There is an instance of a patient accustomed to take $2\frac{1}{2}$ grains of quinine daily discarding

the practice for 10 days and then developing blackwater fever. Another patient developed blackwater fever 14 days after the last dose of quinine. In seven cases, including five adult negroes, no quinine whatever had been taken. Twenty-four out of fifty-two had taken no quinine for a period varying between some weeks and 34 months. Of the thirty-eight regular five-grain takers, twenty-six developed haemoglobinuria twelve or more hours after their usual prophylactic dose, and in nine the interval was 24 hours. Turning to the large doses there are instances of blackwater fever supervening after three consecutive doses of 15 grains each, of 5 grains taken four times daily for five successive days, of 10 grains taken twice daily for six successive days, and of 5 grains taken four times daily for eight successive days before haemoglobinuria occurred. Even larger doses have been taken, such as 10 grains, thrice daily for eleven consecutive days before the attack.

It may be accepted that in every instance the disease was typically blackwater fever. The two factors to be discussed are the toxic effect of the malaria parasite and possibly the toxic or toxin-liberating effect of quinine. As has been shown, a considerable number of cases of blackwater fever are not obviously associated with recent quinine. In the majority of cases, however, there is a very definite association. There are two reasons for this: (a) prophylactic quinine is in common use; and (b) quinine is practically always taken or prescribed in the treatment of fever until it is decided that the fever is not due to malaria. It may be said that the interval between the last dose of quinine and the appearance of haemoglobinuria varies, the dose varies, the total amount of quinine varies, and the possible accumulative effect varies. In fact, if quinine be the precipitant it is sometimes delayed in its action, sometimes rapid; sometimes only minute single or successive doses are required; and sometimes large single or successive doses.

The author considers that these facts may be explained by delayed absorption or it may be that the critical stage in a malarial attack which precedes the lysis of the red blood corpuscles had not been reached, while the earlier doses were being administered. In view of the facts, however, it seems possible to acquit quinine of specific complicity in the production of blackwater fever. It is more fitting to stress that quinine is the greatest safeguard against it, for, by proper quinine treatment, no case of malaria due to the subtertian parasite should proceed to that chronic condition of infection which is the precursor of blackwater fever. [This statement is of little value unless accompanied by a precise definition of what is implied "by proper quinine treatment."] It cannot be denied that in many cases quinine is apparently the immediate cause or precipitant in blackwater fever. Nevertheless, when malarial parasites are present in the blood, quinine must be administered, and if the drug be given cautiously it is more than probable that its definite curative effect far outweighs its causative rôle in blackwater fever. [Here again the author should define the word "cautiously."] It should be emphasized that at a certain stage of chronic subtertian malaria in certain subjects, because of inadequate quinine treatment, a febrile attack which culminates in blackwater fever is inevitable and will ensue whether or not quinine be administered. [It would really be interesting, if not advantageous, if the author would be good enough to state precisely what he regards to be adequate quinine treatment, and adequate quinine prophylactic treatment.] There were 102 deaths in 390 cases. The death-rate is lowest in the

regular quinine takers and highest in those who habitually neglect the prophylactic use of the drug. The following figures are given :—

Regular takers	...	130 cases, 25 deaths, 19·23 per cent.
Irregular takers	...	172 cases, 43 deaths, 25 per cent.
Seldom takers	...	88 cases, 34 deaths, 38·62 per cent.

The author concludes by remarking that the effect of quinine during the course of, or after the cessation of, haemoglobinuria will be discussed in a later communication.

W. Y.

- i. LEE (S. W. T.). **Report on Blackwater Fever in Uganda for 1929.**—*Uganda Protectorate Ann. Med. & San. Rep. for Year ended December 31st, 1929.* Appendix No. III. pp. 89–94. With 1 chart.
- ii. ROBERTS (C. E.). **Two Cases of Blackwater Fever in Africans.**—*Ibid.* Appendix A. p. 70.

i. During 1929, a total of 113 cases of blackwater fever were reported as having occurred in Uganda. Reports were submitted by Government Medical Officers of 73 cases—10 Europeans, 60 Asiatics, and 3 African natives. From mission doctors and private practitioners 9 cases were reported—1 European, 7 Asiatics, and 1 African native. Twenty-one other cases were reported without details. The mortality amongst 113 cases was 18 (21·9 per cent.) [? 15·9]. In tables information is given regarding the distribution of the cases throughout the Protectorate, the number of cases occurring in each month, the age of the patients, and the length of residence of the Europeans in the tropics. Nineteen of the patients are reported to have had previous attacks of blackwater fever. Seven of the patients are stated to have taken prophylactic quinine regularly, 46 to have taken it irregularly, 7 not to have taken it at all, and in 13 there is no record. Details are given in tabular form of the results of blood examination.

ii. Details are given concerning two cases of blackwater fever in African natives. The first was fatal and was, in fact, only diagnosed at post-mortem examination; the second patient recovered.

W. Y.

- LEE (S. W. T.). **Report on Blackwater Fever in Uganda for 1930.**—*Uganda Protectorate Ann. Med. & San. Rep. for Year ended December 31st, 1930.* Appendix III. pp. 82–87. With 1 chart. [Received 7th September, 1931.]

During 1930, 147 cases of blackwater fever were reported in Uganda, 18 Europeans, 122 Asiatics, and 7 Africans. The mortality amongst the Europeans was 22·2 per cent., amongst the Asiatics 25·4 per cent., and amongst the Africans 14·2 per cent. Details concerning the distribution throughout the Protectorate, the monthly variation over the last six years, race, sex and age, length of residence in the tropics, previous attacks of blackwater fever, quinine prophylaxis, and condition of the blood are given in tables.

W. Y.

SHELLEY (Horace M.). **Blackwater Fever in Nyasaland—An Analysis of Sixty-Seven Cases.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1931. Aug. 8. Vol. 25. No. 2. pp. 129–136. With 2 charts & 1 map in text.

The statistics used in this article were compiled from reports on cases which were submitted to the Nyasaland Government by various medical officers, including the author, during the period 1921–1930. During the period in question there were 50 cases amongst Europeans and 17 amongst Asiatics.

The following summary is given :—

" 1. Malaria is widespread over the whole country, and the incidence of the different species of *Plasmodium*, is as follows :—*P. falciparum* 84 per cent., *P. vivax* 14 per cent., *P. malariae* 2 per cent.

" 2. Anti-malarial measures are unsatisfactory, and this is particularly true for the planter section of the population.

" 3. Blackwater fever has not shown any tendency to increase in proportion with the population.

" 4. No race except the indigenous native is immune from attack.

" 5. Two-thirds of the cases occurred in the highlands of the country where there is a heavy rainfall and high humidity.

" 6. Most of the cases were seen during May, June and July, in the middle of the dry season, when it is so cold that fires are required.

" 7. The prevalence of reported cases of malaria and the incidence of blackwater fever during any given year appear to show no coincidence.

" 8. Most cases of the disease occurred in persons of from 20 to 30 years of age.

" 9. Occupation is of considerable aetiological importance. A striking feature is the absence of the disease in Government officials, and its prevalence in members of the planting community.

" 10. Over 90 per cent. of the patients gave a history of repeated attacks of malaria.

" 11. The susceptibility of an individual to blackwater appears to increase during his first year in the country ; and to diminish again until the sixth year of residence when he again becomes very susceptible.

" 12. The onset of the disease is not always ushered in by a rigor, the presence or absence of which is of little prognostic import.

" 13. No racial differences were noted in the duration of haemoglobinuria.

" 14. Parasites were found in the blood of ten patients only.

" 15. One patient's temperature did not rise above normal throughout the whole of his illness.

" 16. Suppression of urine was the chief complication, and occurred in 14 per cent. of the total number of cases.

" 17. There is no specific treatment for the disease."

W. Y.

STRICKLAND (C.) & CHOWDHURY (K. L.). **Blackwater and Malaria in the Darjeeling Terai.**—126 pp. With 1 chart & 4 folding maps. [13 refs.] 1931. Calcutta: Catholic Orphan Press, 3 & 4, Portuguese Church Street.

The Darjeeling Terai of Northern Bengal, which was the scene of the work here reported upon, is a notoriously malarial and blackwater fever-affected area. An account is given of the physiography of the country, and a summary of the findings regarding the anophelines present, the spleen index, and the parasite index in children. The

spleen index for the whole Terai was 73.6 per cent. amongst 2,221 children; the parasite index was 47.4 per cent., of which 17.5 per cent. were multiple infections. Of 1,753 slides examined, 27.4 per cent. showed *P. vivax*, 9.5 per cent. *P. malariae*, and 30.8 per cent. *P. falciparum*. Between January, 1918, and March, 1929, the recorded cases of blackwater fever amounted to 85.

The authors gave the following summary of their work:—

"We have concluded that blackwater in the Darjeeling Terai occurs always in persons that have been associated with communities subject to hyperendemic malaria, and the inference to be drawn from this is that a high malaria-infection or inoculation-rate in the individual is a necessary predisposing factor. Keeping this hypothesis in view the comparative freedom of some highly malarious countries seemed to need explanation and such cases we think to be due to a favourable chance distribution in the constituents or sections of these communities of that multi-inoculation rate.

"We have accounted for the chance divergences from an average infection-rate in the community, which we postulate to be necessary for the induction of blackwater in the individual, by the proposition that *funestus*, by reason of special habits, as opposed to those of say the common malaria-carrier *maculatus*, is a particular agent in the case. Manson-Bahr has said that the occurrence of several cases in the same family may not be pure coincidence, but probably may be explained by exposure to a common factor which 'has given rise to the term 'blackwater-fever houses' in certain districts, especially Rhodesia, but these when investigated are proved to be bungalows with exceptionally bad surroundings, and highly malarious.' In the Terai that 'common factor' is, we think, *funestus*.

"On the analogy of the correlation that we found in blackwater gardens between the degree of blackwater incidence and malarial endemicity which was in keeping with general opinion in the matter, we consider that a correlation that we discovered between blackwater and both quartan and benign tertian infection may represent a true picture of a special relationship between these parasites and blackwater. Malignant-tertian infection consistently appeared to have the least influence, but in view of the insistent statements elsewhere to the contrary we are inclined to conclude that the different species have no specific importance, and that, in one country, one species, in another, another, may be concerned. No extensive statistical analysis can we think possibly decide this point, it may only indicate the truth which must be clinched in the clinical laboratory.*

"We have not observed any association between blackwater and any other species of malaria-parasite than those mentioned. The suggestion of another infection superposed on malaria inducing blackwater we have been inclined to disregard on the common ground that it is unwise to look for two diseases in one syndrome.

"In view of the malaria-theory of blackwater we have elucidated some facts that follow logically from the theory. For instance we found a great predisposition to blackwater among some who lived close to masses of highly infected persons, to wit the coolies on the estates.† The condition of a habitation did not appear to have much influence, nor did the proximity of jungle round about: the latter being on all fours with the discovery made in Malaya by the senior writer of this report that jungle is not usually dangerous, as so often believed. We also note here the opinion commonly held by medical officers long resident in the Tea Districts, viz., that the introduction of mosquito-proof houses for the European

* The F.M.S. Medical Dept. Annual Reports 1927 and 1928 specifically mention that both *P. vivax* and *P. falciparum* were found in blackwater cases.

† At a furlong distance the chance of a non-cooly habitation becoming stricken with blackwater was 22 : 3 = 88 per cent.

superior staff of the Estates has appeared to be a very important factor in determining a lesser incidence of blackwater in this community.

"A general correspondence in the seasonal incidence of malaria with blackwater, this however being a little later, is further evidence in favour of the malaria-theory.

"Incidentally it shows that lengthy 'incubation' of blackwater is not usual; and that this is so is also proved by the frequent reports of cases in which the first attack has occurred within a few weeks' residence in a country, a circumstance coming within also our purview in the Terai. The evidence then indicates that the hypothetical multi-inoculation of malaria may rapidly give rise to a predisposition to blackwater; a long period of gestation is not necessary.

"With regard to differential racial incidence, the remarkable freedom, comparatively speaking, of the 'cooly' from blackwater under highly malarious conditions, could not be accounted for on the ground that he is an *indigène*, because he is not so, nor on the ground of malarial 'immunity,' as about 11,000 of this class came from the Nepál country high above the malaria-zone, and were notoriously susceptible to malaria. We have suggested then that the cooly, whether of a malaria 'susceptible' caste or malaria-'immune,' is saved from a high malaria inoculation-rate and therefore blackwater, by reason of his habit of fumigating his habitation daily with the smoke of his kitchen fire; or alternatively that his habit of living in close association with his domestic animals may divert some degree of infection from himself.

"On the subject of quinine we have shown that it is mostly those of the population who take quinine that develop blackwater but we have also seen that coolies who take quinine do not suffer from blackwater to the same extent as other races who take quinine, which we ascribe to the lesser predisposition of the cooly to blackwater, as noted immediately above. Quinine is to be regarded as a spark that explodes the malarial multi-inoculation bombshell.

"The fact that in one person blackwater could always be induced by the administration of quinine, as also the cases that occur in England, indicate that once the predisposition through malaria multi-inoculation has been induced it persists and an exciting cause may at any time induce the condition.

"It may be quinine, it may be cold or exposure, or if one may trust to one's memory of a public lecture it may be due to taking a surfeit of ice-creams."

After a short section on malaria, the report closes with certain recommendations for the prevention of blackwater fever and malaria and a lengthy series of tables giving information on such points as spleen-indices and blackwater fever incidence, parasite-indices, mosquitoes, condition of estate houses and surroundings, blackwater case records, blackwater distribution in the Terai, and so forth.

W. Y.

STRICKLAND (C.) & CHOWDHURY (K. L.). **Malaria and Blackwater Fever at Noamundi.**—*Indian Jl. Med. Res.* 1930. Oct. Vol. 18. No. 2. pp. 377-389. With 1 map in text. [3 refs.] [School of Trop. Med. & Hyg., Calcutta.]

In August, 1929, the authors were enabled to make a few observations on some of the conditions associated with blackwater fever and malaria at Noamundi, a railway settlement in the Singbhum district of Chota

Nagpur and, as a control to these observations, some others in an adjoining valley—that of Betlata, which is the home of the aboriginal Kols.

The following summary is given :—

“ The observations that we made in this Noamundi area lend support to the theory evolved by us from the data collected in the Darjeeling Terai that while blackwater is usually associated with hyper-endemic malaria, its irregular distribution, as exemplified by b.w. houses, is due to variations from an average malaria infection-rate leading to a more intense local infection-rate sufficient to induce the condition.

“ A spleen-index of any size from 0 to 100 may hypothetically represent an average infection rate per person either sufficient or insufficient to induce b.w. As, however, a spleen-index of 100 per cent. often does not lead to b.w. we must presume that unless the average infection rate is n times the minimal rate that can produce this spleen-index b.w. will not arise, but if the necessary rate be attained all the persons in a community will get b.w. As this never occurs we must conclude that an average rate applied to all members of a community never happens. Variations from the average infection-rate of a community lead to more intense infection-rates in some and less intense in others and when the critical infection rate is reached the b.w. prodrome is induced, so that ex-hypothesi if the local variation is sufficient a minimal spleen-index may be associated with b.w., or if the variation from the average is not sufficient even a 100 per cent. spleen-index may not be associated with b.w. It is only a matter of chance.

“ In the concrete, at Noamundi what was not a so-called hyper-endemic malaria-rate, viz., 44 per cent., was associated with much b.w.

“ The necessary variation in the malaria infection-rate is, as we have concluded for the Terai, the function of the species *A. funestus*. Sufficient variation from an average infection-rate, in itself sufficient to yield a 100 per cent. spleen-index, is not a function of *A. maculatus*. The reason for the difference doubtless lies in a difference in habits, one of which is a certain ‘domesticity.’ In the Terai we showed that this in *funestus* might be given as 16 times that of *maculatus*.

“ At Noamundi we have concluded that *culicifacies* is the agent and it would appear that the variation from the average infection-rate whenever this species is the agent is even greater than in the case of *funestus*, for severe b.w. at Noamundi was associated with the comparatively low spleen-index of 44 per cent. (75 per cent. in the Terai) and this fact is to be explained on the ground of a greater domesticity of *culicifacies* (we made it 30 times that of *maculatus* and about twice that of *funestus*).

“ One is then naturally led to wonder whether all the *Myzomyias* have such particularly domestic habits that they are all associated with b.w. *A. jeyporiensis* is the reported carrier of malaria in the Jeypore Hill Tracts.

“ The distribution of b.w. among Bengalees as opposed to coolies at Noamundi may be accounted for as in the Terai, on the ground, not of ‘malaria immunity,’ but that the coolies naturally and constantly fumigate their dwellings. Mr. McGregor conducting the collection of adults for us always found it very difficult to catch anophelines in the coolies’ ‘bashas’* while he could constantly find large numbers in the superior habitations.

“ One may conclude that while most of the superior classes took quinine for malaria, only a small proportion of coolies did so, although this constituted a larger absolute number than the former. Therefore if quinine treatment be an excitant of b.w. it follows that the necessary fragility of the blood is not so prevalent in the cooly, which we have explained above.

W. Y.

* Hutments, habitation.

SOROMENHO (L.). **Spirochaetes in the Faeces of Patients with Blackwater Fever.**—*Lancet*. 1930. Nov. 8. pp. 1015–1016. With 1 text fig.

Being impressed with the predominance of biliary symptoms in blackwater fever, the author decided to examine the bile with a view to searching for the cause of the disease. He punctured aseptically the gall bladder of a patient who had died six hours previously of a severe attack of blackwater fever at Tete, Portuguese East Africa. Films of the bile stained with carbol-fuchsin showed innumerable spirochaetes. Supported by this discovery he examined the faeces, blood and urine of the next seven cases of the disease which fell into his hands. Nothing was found in the blood or urine, but in the faeces of every case spirochaetes were found—numerous during the febrile stage and disappearing rapidly as the temperature fell and the patient entered convalescence. Soromenho writes "In the faeces of a few cases (four) of quinine haemoglobinuria (at the beginning indistinguishable by its symptoms from true blackwater fever), I was unable to find any spirochaetes." Neither could he find spirochaetes in 14 white patients suffering from intestinal complaints, but they were present in the faeces of 6 of 23 natives with intestinal troubles.

The spirochaetes in the faeces of the natives were indistinguishable from those in the blackwater fever patients and were apparently *Spirochaeta eurygyrata* or, at least, a very closely allied organism. The author in conclusion enquires whether the spirochaete he has found has any connexion with the aetiology of blackwater fever or is merely a normal saprophyte of human stools. [On the face of it, the latter seems the more probable conclusion.]

W. Y.

MÜHLENS (P.) & KNABE (K.). Ein Fall von Schwarzwasserfieber mit aussergewöhnlich starker Chininüberempfindlichkeit. [**A Case of Blackwater Fever with Unusually Pronounced Quinine Susceptibility.**]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1931. Feb. Vol. 35. No. 2. pp. 73–81. With 1 folding plate. [Inst. for Ship & Trop. Diseases, Hamburg.]

Since the War but few cases of blackwater fever have been admitted to Hamburg for treatment, and during the last 7 years the authors have only seen 9 cases; one of the patients suffered from diabetes and died, as did also a second from cachexia. The remainder recovered and again became accustomed to quinine.

Among these cases was one of special interest not only because of his remarkable sensitiveness to quinine, but also because it was not until after treatment lasting 5 months that a clinical cure of the malaria and blackwater fever was obtained and the patient had become tolerant of quinine. A very detailed account of this case is given and should be consulted in the original by those interested.

The following are the main facts :—

The patient, a young seaman, took for the first time in 1929, one tablet of quinine as a prophylactic; it was badly borne. On February 2nd, 1930 he had an attack of malaria in West Africa and was given a tablet of plasmochin compound. Again, the drug was badly tolerated and vomited. The patient had further attacks of fever, and when he was admitted to the Institute for Tropical Diseases in Hamburg, the blood contained numerous *P. falciparum*. He was again given a tablet of quinine plasmochin (quinine 0.3 gm., plasmochin 0.01 gm.); this was followed by a

severe attack of blackwater fever. The authors draw attention to the fact that in this case there was no prolonged sojourn in the tropics, no prolonged tropical malarial infection, and no long or irregular prophylactic quinine. In fact, from the very beginning the patient had shown definite quinine idiosyncrasy.

It was found impossible to accustom the patient to quinine. Even the smallest doses, e.g. 0.05 gm. of quinine urethane produced haemoglobinuria. This was the more unfortunate, as *P. falciparum* did not disappear from the peripheral blood and the patient had repeated attacks of malaria. On account of the malaria, repeated efforts were made to accustom the patient to quinine, and the drug was given in combination with other medicaments, such as cholesterin, neosalvarsan, etc. Each attempt, however, was followed by blackwater. In all, the patient had nine attacks of blackwater and numerous paroxysms of malaria. The result was he became exceedingly ill and debilitated.

In view of the impossibility of employing quinine, plasmochin alone was tried. This drug was well tolerated and as much as 0.02 gm. was given daily for 21 consecutive days. In all, during the six months, the patient received 4.755 gm. of plasmochin, which appears to be the greatest amount ever given to a patient without any ill effects. Unfortunately, however, these prolonged courses of plasmochin alone did not result in the disappearance of rings from the peripheral blood for more than a short period. In contrast, however, it is noted that crescents were never found whilst the patient was taking plasmochin, but that they appeared once 7 days after, and on two occasions 10 days after, the cessation of plasmochin. On a further administration of plasmochin crescents again disappeared. In this case, it is clear, therefore, that plasmochin alone did not suffice to clear the blood of schizonts.

The quinine double salt, beitsan (0.075 gm. quinine, together with calcium lactate) was tried on April 15th. The patient reacted with high fever, and after three similar doses the next day he had an attack of blackwater. On April 23rd a single dose of beitsan again produced high fever with severe general symptoms, but not haemoglobinuria.

After a 21-day course of plasmochin, several neosalvarsan injections were given, and between May 26th and June 18th, in addition to repeated doses of plasmochin, an intramuscular injection of 5 cc. of splenotrat (Nordmarkwerke, Hamburg) was given every second day, and on the intervening days spleen and liver were given by the mouth. On June 18th, beitsan was again commenced and it was now found possible gradually to accustom the patient to this drug until daily doses of 0.5 gm. were tolerated. On July 2nd after a dose of 0.55 gm. of beitsan, the patient had a slight attack of blackwater fever. Up to July 8th, he was given in all 18 injections of splenotrat. Ultimately, it was found possible with the aid of beitsan and plasmochin to cure him, and he has remained free from parasites since July 14th. The last examination was on November 29th, when the blood was found to be negative and the spleen and liver to be normal.

The authors consider that the feeding with spleen and the injections of splenotrat may have had something to do with the development of quinine tolerance in this patient and consider that further observations on these lines should be made.

W. Y.

LEMIERRE (A.) & RUDOLF (Maurice). Sur un cas mortel de fièvre bilieuse hémoglobinoïdique. [A Fatal Case of Blackwater.]—*Bull. et Mém. Soc. Méd. Hôpit. de Paris*. 1931. May 11. Year 47. 3rd Ser. No. 15. pp. 721–729. With 4 text figs. [1 ref.]

An account is given of a patient who was admitted to hospital in Paris during the evening of May 15th, 1929, suffering from a severe

attack of blackwater fever. When seen by the authors the next morning the patient was moribund; there was marked icterus, the liver was normal, and the spleen was enlarged and easily palpable. The patient died at 1.30 p.m. The urine contained haemoglobin, a few leucocytes, but no red cells. The blood count gave: Erythrocytes, 870,000, and leucocytes 18,900; no malarial parasites were found.

This brief clinical account is followed by a detailed description of the pathological findings at the autopsy; the most interesting were those of the liver and kidneys.

Liver. There was a remarkable integrity of the hepatic parenchyma. There was no dislocation of the cells, they appeared normal, and there was no fatty degeneration. There was no vascular distension, but all the capillaries contained, in addition to more or less normal red cells, an abundance of haemoglobinic granules. These granules, so far as their size and staining affinities were concerned, appeared to be identical with those found in the renal tubules. The portal spaces were normal without inflammatory changes. Staining by Levaditi's method failed to reveal spirochaetes; and no malarial parasites were found in sections.

Kidneys. On the whole, the kidney structure was remarkably well preserved. All the tubules (the secretory and excretory) were full of haematinic granules. For the most part the tubules appeared intact. Only here and there was there evidence of fatty degeneration. There was no renal sclerosis or capillary congestion. In places, however, the convoluted tubules showed desquamation. In the pyramidal portion were plugs, partly purely haemoglobinic in nature and partly cellulo-haemoglobinic.

[These renal appearances have, of course, frequently been described in blackwater fever, and also by the reviewer in babesia infection and in experimentally produced haemoglobinuria. The observation of similar granules in the hepatic capillaries is interesting.]

W. Y.

BLANCHARD (M.). Sur la pathogénie de l'hémoglobinaurie dans la fièvre bilieuse hémoglobinaurique. [**The Origin of Haemoglobinuria in Blackwater.**]—*Bull. Soc. Path. Exot.* 1931. June 10. Vol. 24. No. 6. pp. 473-475. [2 refs.]

The author refers to the paper of LEMIERRE and RUDOLF [above] and remarks that it is very rare to find so complete an account of the pathological findings in this disease and at the same time one which has so great an interest for a conception of the pathogenesis of the haemoglobinuria. He mentions the two theories concerning the site of haemolysis in blackwater fever, viz., the renal and the vascular. The chief difficulty in accepting the latter theory is the fact that many observers have failed to find haemoglobinaemia. [In the reviewer's opinion this is because these observers have failed to examine the blood at the proper time, or because their technique was inadequate. The reviewer has invariably discovered definite evidence of haemoglobinaemia in the many cases he has examined during a blackwater fever paroxysm.]

The mechanism of a renal haemolysis would be as follows: Under the influence of a vaso-constriction produced by the rigor, which occurs at the commencement of every case, there is produced a renal congestion with small intraglomerular haemorrhages; the red cells are then lysed

either in the kidney by haemolysis or in the urine owing to the hypotonicity of this fluid [the reviewer has frequently shown that the urine is not hypotonic in blackwater fever.]

The haemolysis in this case was evidently vascular because the granules of haemoglobin were present both in the liver and in the kidneys.

W. Y.

PENINGTON (Raymond G.). **Blackwater Fever with Hyperpyrexia in a New Guinea Native.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1931. Aug. 8. Vol. 25. No. 2. pp. 137-140. With 1 chart.

Despite the high rate of malignant tertian malaria among the natives of New Guinea, blackwater fever is so rare that the author considered that it was worth while giving a detailed account of a case which came under his care. He draws attention to the following points of interest in the case:—

" (1) Blackwater fever occurring in a full-blooded native.

" (2) The long period of haemoglobinuria with subsequent recovery: viz., eight days, with two recurrences when taking quinine, the first lasting twelve hours, the second, eight hours.

" (3) The comparatively large quantities of urine passed daily throughout the illness.

" (4) The occurrence of frequent rigors, daily or more often, during and subsequent to haemoglobinuria, associated with an absence of malaria parasites in blood films.

" (5) The comparatively slow pulse-rate throughout the disease."

UJLAKI (P.). Beitrag zur Therapie des Schwarzwasserfiebers. [**The Therapy of Blackwater Fever.**]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1930. Dec. Vol. 34. No. 12. pp. 625-629. [7 refs.]

The paper commences with various speculations regarding the etiology of blackwater fever. The author believes that certain people have a predisposition to blackwater in that in them there exists a constitutional lability of the combination of haemoglobin with the red cells. He considers furthermore that the immediate cause of the disease is a disturbed liver function. This disturbed liver function is due to prolonged malaria infection. He added the washed red cells of a blackwater fever patient to the serum of an untreated case of malaria. No haemolysis occurred. When, however, a piece of liver from a patient who died from blackwater fever was added to the mixture, haemolysis took place. He considers that this observation, which, by the way, he has not had an opportunity of repeating, confirms his hypothesis, in that in his test tube he had all three factors necessary for the production of haemolysis, viz., the defective red cells of a blackwater fever patient, the liver factor from a dead case of blackwater, and the plasmodium-rich serum of a malaria patient.

On the basis of this hypothesis, the author has devised a method of treating blackwater, which consists essentially in the administration of glucose by the mouth and insulin injections, with a view to supporting the liver function. In order to counteract the haemolysis he gives injections of auto-serum. Quinine is only given when parasites are present in the blood.

W. Y.

MATHIEU. Les injections d'huile choléstérinée dans le traitement de la fièvre bilieuse hémoglobinurique. [**Injections of Cholesterinated Oil in the Treatment of Blackwater.**]*—Bull. Soc. Méd.-Chirurg. Indochine.* 1931. Jan. Vol. 9. No. 1. pp. 28-50. [Luang Prabang Hosp., Luang Prabang.]

Dr. OTT sent to the author at Luang Prabang (Laos) some ampoules of cholesterinated oil, and asked him to try the drug in cases of blackwater fever. Details are given of 14 cases so treated. In only one was the issue fatal and in this death appeared to be due rather to malaria than to blackwater fever. The other thirteen cases, some of which were extremely severe, all recovered. The author remarks "that the haemoglobinuria ceased rapidly, thanks to injections of cholesterin in doses of 1 gm. per day."

W. Y.

AMIGUES (M.). Deux cas de bilieuse hémoglobinurique traités par le sérum médical de Normet, avec résultats très favorables. [**Two Cases of Blackwater treated with Normet's Serum, with Benefit.**]*—Bull. Soc. Path. Exot.* 1930. Nov. 12. Vol. 23. No. 9. pp. 999-1000.

Details are given of the treatment of two severe cases of blackwater fever with polycitrated serum (medical serum of Normet). Both cases recovered rapidly and the author believes that his treatment was in some measure responsible.

W. Y.

TALÉC. Observation d'un cas de fièvre bilieuse hémoglobinurique. [**A Case of Blackwater Fever.**]*—Ann. de Méd. et de Pharm. Colon.* 1930. Apr.-May-June. Vol. 28. No. 2. pp. 249-254.

A clinical account is given of a case of blackwater fever, in which death occurred from acute anaemia about a week after the cessation of haemoglobinuria, notwithstanding several transfusions of blood and the administration of many other remedies.

W. Y.

GILLISPIE (A. M.). **Report of a Case of Blackwater Fever in a Full-Blooded African Boy.***—Gold Coast Rep. on Med. & San. Dept. for Year 1929-30.* Appendix B. pp. 185-191.

A clinical account is given of an attack of blackwater in an African native.

W. Y.

REVIEWS AND NOTICES.

KHALIL (Mohamed). **The Specific Treatment of Human Schistosomiasis (Bilharziasis) with Special Reference to its Application on a Large Scale.** With Notes: **Ueber Fuadin (Neo-Antimosan)** [SCHMIDT (Hans)]; **The Physiological Action of the Antimosan Compounds** [HAMMOUDA (M. M.)]; **Ueber die Beeinflussung des Blutkreislaufes durch einige Antimonpräparate** [WEESE (H.)].—*Beihefte z. Arch. f. Schiffs- u. Trop.-Hyg.* 1931. Vol. 35. No. 2. pp. 1-128 (105-232). With 14 figs.

Since the war, considerable activity has taken place in investigating the specific therapy of bilharziasis and a large body of literature has accumulated around the subject. In Egypt, where 10 out of its 15 million inhabitants suffer from the disease, these investigations have been especially active; not only have various drugs been tested, but mass treatment of large numbers of patients has been carried out. Professor Khalil, in preparing this monograph on the specific chemotherapy of the disease, has drawn on the results of these treatment campaigns in addition to reviewing all the literature on the subject as far as it was available. The monograph is divided into six sections. The first, a short section, deals with the older non-specific treatment; the second with emetine; the third and fourth with the simpler and with the more complex antimony compounds. The fifth treats of the excretion of antimony from the human body, while the last discusses the pharmacological action of the complex antimony compounds on the circulation and respiration.

Emetine, he holds, is very effective when given in intravenous daily doses, but is not entirely free from danger; its use in Egypt is limited to children and fat patients, to cases of intestinal bilharziasis complicated with amoebic dysentery, or where there is intolerance to tartar emetic or the other antimony preparations. Tartar emetic is the drug in most frequent use, and as over 300,000 cases are treated annually, its technique and disadvantages are fairly well understood and are described in detail. Its more important contraindications are nephritis, heart failure, jaundice, fever or cases of chronic bilharziasis not discharging living ova. Various complex antimony salts have been tried out, the most important being "Neoantimosan" or "Fuadin" which appears to be even more effective than tartar emetic. The duration of the treatment is ten days shorter; more cases can be treated by the same staff and there is an absence of local complications. On the other hand, it is more expensive and in certain cases causes bradycardia.

Pharmacologically, antimony appears to be a cumulative drug which is slowly excreted by the kidney; while the complex compounds, such as fuadin, have hardly any effect on the heart, blood-pressure, respiration or the intestinal movements.

The monograph, which although published in Germany is mostly written in English, contains an extensive bibliography and should prove of great value to the tropical-clinician and health official.

T. W. M. Cameron.

BUREAU OF HYGIENE AND ~~TROPICAL~~ DISEASES.

TROPICAL DISEASES BULLETIN.

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[No. 12.

LEPROSY.

LEAGUE OF NATIONS. HEALTH ORGANISATION. **Report on the Study Tour of the Secretary of the Leprosy Commission in Europe, South America and the Far East. January 1929-June 1930.** C.H.887.—48 pp. 1930. Geneva.

———. **The Principles of the Prophylaxis of Leprosy. First General Report of the Leprosy Commission.** C.H.970. L.o.N.P. III. Health. 1931. III. 2.—12 pp. Geneva. [6d. \$0.15.]

The report on the tour of the Secretary of the Leprosy Commission, Dr. BURNET, is a mine of information on the prevalence of leprosy in the most infected countries of the world, and the very varied methods of prophylaxis adopted by them, which should be consulted by all interested in the subject. Much of the information has already been dealt with in this *Bulletin*, but the present report will be most useful for reference. The data regarding the prevalence of the disease are summarized in an annex. In a section on conclusions the slow progress in the prophylaxis of leprosy is emphasized and it is stated that "the regulations are still too administrative in tone and have not yet acquired the necessary medical character." The great divergence of views which still persists regarding the value of segregation is pointed out, and a plea is made for meetings between leprologists to discuss a general policy. With regard to treatment it is stated: "this question dominates all others to-day" and early treatment is generally agreed to offer the best chances of success, but grave differences of opinion still remain regarding the duration of the good effects obtained by modern methods. Research and organization are, therefore, still required and prophylaxis should be placed on an international basis.

The first general report of the Leprosy Commission deals with principles of prophylaxis in the light of the great advances made during the last decade as the result of improved treatment, which is now regarded as "the most important line of attack in addition to that of isolation." A diet rich in vitamins, exercise and the use of the ethyl esters and salts of chaulmoogra oils are the special methods of treatment advised. To prevent isolation promoting concealment of cases, with delay in the all-important early treatment, segregation should only apply to infectious cases, with dermatological clinics for early uninfected ones at hospitals, or at special leprosy clinics when

the cases are numerous. Medical students and practitioners should have special courses of instruction in the treatment at one or more central leprosy institutions in each country, where research will also be carried on. Propaganda is necessary to combat indifference to the disease on one hand, and blind panic on the other, and to teach the people that leprosy is contagious, but also remediable as with tuberculosis. Crippled uninfected patients may require special colonies, and all those apparently recovered should be periodically examined after discharge. The children of lepers should be separated from the parents as soon as possible after birth, and marriages of lepers and propagation of children by them should be discouraged. School children should be inspected and all leprous ones removed. The conclusion is also come to that "there is no reliable system of prophylaxis without treatment, and it is generally accepted that the earlier the treatment is instituted the better will be the results." It is much to be desired that these propositions should be accepted and acted on in all leprosy-infected countries.

L. Rogers.

LEPROSY REVIEW. 1931. July. Vol. 2. No. 3. pp. 79-118. With 8 figs. on 4 plates. Quarterly Publication of the British Empire Leprosy Relief Association, 29, Dorset Square, London, N.W.1.

This number contains a review of the Leonard Wood Memorial Conference on Leprosy by T. F. G. MAYER, articles on the intra-dermal injection treatment by the Editor and on the leprosy problem in Cebu, Philippines, by J. RODRIGUEZ, on non-irritating iodized ethyl esters of *Hvdnocarpus wightiana* by H. I. COLE, chemist in the colony at Culion, and an abridged memorandum on the present position of prophylaxis against leprosy in relation to recent improvement in treatment. In Cebu 5,290 lepers were discovered between 1902 and 1929, and most of them were sent to Culion. A close relationship was demonstrated mathematically between density of population and leprosy prevalence. A leprosy dispensary has recently been opened in Cebu for the treatment of early cases.

L. R.

LEPROSY REVIEW. 1931. Oct. Vol. 2. No. 4. pp. 120-162. With 7 figs. (1 map) on 2 plates. Quarterly Publication of the British Empire Leprosy Relief Association, 29, Dorset Square, London, N.W.1.

This number opens with an article by E. BURNET on the League of Nations and the fight against leprosy on the lines of the first article reviewed in this number of the *Bulletin*. A. C. Stanley SMITH deals with leprosy in Kigezi, Uganda, where an island settlement is about to be started: the disease is of a severe type. R. G. COCHRANE reports what is known of the prevalence of the disease in Kenya, Zanzibar and Tanganyika, and he pleads for a whole-time leprosy worker to carry out a survey in the last-named area. F. G. ROSE reports favourably on the treatment of leprosy in the Mahaica leprosy hospital of British Guiana, where the proportion of patients discharged without deformity has risen from 14.3 per cent. in 1923 to 93.8 per cent. in 1930. Dr. Isabel KERR of Dichpali deals with metabolism in relation to treatment, and advises gr. $\frac{1}{2}$ of P.D. & Co. thyroid extract daily in cases with alopecia of the eyebrows, ichthyosis and scaly lesions. A. R. DAVISON

of the S. Africa Emjanyaya Leprosy institution writes: "Scoffers at the efficiency of our modern anti-leprotic treatment are as plentiful in South Africa as they are in other parts of the world," and records that prior to regular treatment being begun in 1926 only burnt-out crippled uninfected cases were discharged, but from 1927 to 1930 active treatment increased the discharge rate two and a half fold, mostly uncrippled patients. He advocates 5 cc. doses of ethyl esters or 5 per cent. alepol, especially the latter, 100 cc. of a 10 per cent. solution being non-toxic but painful.

L. R.

BRITISH EMPIRE LEPROSY RELIEF ASSOCIATION. (Indian Council.)
Report 1930 [SMITH (H. Moncrieff), Chairman.]—112 pp. With 12 figs. (3 maps, 1 folding) & 1 folding chart.

This report gives a good account of the propaganda, survey and treatment plan of work in India. Surveys reveal from two to five times as many cases as are returned in the census figures, and also lead to the establishment of leprosy clinics in which very numerous early amenable cases are treated at small cost. Research work was continued at the Calcutta School of Tropical Medicine, where 104 doctors were also instructed in the treatment of the disease, and 23 more at the Dichpali Leprosy Hospital in Western India. A good example of nine infections through the Hindu joint family system of several generations of a family living together is recorded. A survey of the Almora district of the Kumaon Himalayas showed the main distribution of the disease in villages along the main roads, and infection has been traced to the use by others of blankets of lepers. Clinics are being started at all the district dispensaries. In Bihar and Orissa 9 new clinics were added in the year to the 19 already existing and 5,465 leper patients were treated regularly in the asylums and special clinics in addition to those attending the general hospitals and dispensaries. In the Central Provinces 32 new leprosy clinics were established and no less than 26,564 lepers were treated during 1930, or three times the total in all the leper institutions of the whole of India a few years ago. In Madras the cost of treatment per patient per annum came to 4 shillings.

L. R.

DE MELLO (I. Froilano). Comment nous avons cherché à résoudre le problème de la lèpre dans l'Inde Portugaise. [**The Leprosy Problem in Portuguese India.**]—*Rev. d'Hyg. et de Méd. Préventive*. 1931. May. Vol. 53. No. 5. pp. 321-341.

The author has interested himself in this question since 1916 when the cases were estimated at 100 in Goa, but a recent search has revealed 220 lepers, half of whom are mixed cases and 46 early ones. For the latter only temporary isolation with effective treatment until fit for discharge is advocated with subsequent watching, while cases with only early nerve symptoms may be treated at hospitals and dispensaries. Healthy contacts should be watched for five years and treated directly the earliest signs of the disease appear. A central leprosy institution will be established in the country with humane and scientific rules on the lines of the laws of Norway and Brazil. A draft of the necessary legislation is appended to the paper.

L. R.

TISSEUIL (J.). De la diffusion du bacille lépreux dans un milieu à lèpre endémique. [**Diffusion of Leprosy in an Endemic Area.**]—*Bull. Soc. Path. Exot.* 1931. June 10. Vol. 24. No. 6. pp. 458-463. [Gaston Bourret Inst., Nouméa.]

It has been suggested by MARCHOUX that leprosy may in some places be as widespread as tuberculosis, and this question has been investigated during a visit to 20,000 natives in New Caledonia. Cases were classified into those positive bacteriologically, those with definite symptoms of leprosy, but negative on examination, and those with doubtful symptoms. Among 1,409 people examined out of a population of 1,852 there were found 25 positive, 90 suspected and 313 doubtful, or a total of 22.2 per cent., but in persons examined at a laboratory the total doubtful was 35.7 per cent. The conclusion is come to that in the absence of a reliable biological reaction the number of possible lepers may be fixed at about 30 per cent., so the isolation of 1 to 3 per cent. is not an effective form of prophylaxis, since those remaining free keep up the disease. Hygienic education is advocated as the basis of all prophylaxis.

L. R.

LAQUIÈZE. Prophylaxie de la lèpre en Nouvelle-Calédonie et dépendances. [**Prophylaxis of Leprosy in New Caledonia.**]—*Bull. Soc. Path. Exot.* 1931. June 10. Vol. 24. No. 6. pp. 483-496.

This paper gives further detailed figures of the prevalence of leprosy in this French colony; there is a fall of definite cases from 877 in 1915 to 666 in 1930, but a rise of suspected cases from 378 to 1,367. In the sanatorium of Ducos there are 129 cases. Only 27 cures were reported since 1913 with 8 relapses. No treatment is practicable in the village isolation institutions, where the conditions are not satisfactory.

L. R.

HASSELMANN-KAHLERT (Margarete). Das Problem der Lepra auf den Philippinen. [**The Problem of Leprosy in the Philippines.**]—*Deut. Med. Woch.* 1931. Apr. 24. Vol. 57. No. 17. pp. 724-727.

This is a general account of the well-known work in the Philippines. The figures quoted go as far back as 1927. The most interesting point brought out is that the children of lepers are now separated from their parents after six months, and if they remain free from all symptoms for two years they are sent to their parents or to an education establishment near Manilla. In 1928 10-15 per cent. of the children of the lepers became infected through contact with their mothers before separation at the age of six months.

L. R.

AGUESSY (D.). Sur la fréquence de la lèpre au Haut-Dahomey. [**Leprosy in Upper Dahomey.**]—*Bull. Soc. Path. Exot.* 1931. July 8. Vol. 24. No. 7. pp. 585-587.

In the course of work on trypanosomiasis the author examined 8,944 of the 41,233 inhabitants of the Djougou circle of Upper Dahomey

for leprosy and recognized 130 cases, or 14.5 per mille, which he considers to be far below the true number. In other regions the people fear the disease and isolate cases strictly when they are recognized, but in Dahomey infected persons remain free in the families and are even readily married; this accounts for the high incidence.

L. R.

SPOTO (Francesco) & RUFFINO (Paolo). Contributo allo studio della lebbra familiare. [**Familial Leprosy.**—*Arch. Ital. Sci. Med. Colon.* 1931. May 1. Vol. 12. No. 5. pp. 271–280. With 6 figs. (1 coloured on plate). English summary (3 lines). [Inst. of Colonial Path., Univ., Modena.]

The authors record 4 cases of leprosy in the same family, a mother and 3 children, the latter of whom had always lived in Italy. The mother, 32 years of age, came from S. Paulo, Brazil, at the age of 4 years, and did not develop signs of leprosy till after 18 years' residence in Italy. The children affected were a girl of 16 years, and 2 boys of 11 and 10. The mother and daughter presented the mixed form and bacilli were present in the nasal mucus; the two sons were in an early stage of the nodular form, and so far the bacilli had not been found. It is presumed that the mother contracted her infection in S. Paulo and the children from her by direct contact.

H. H. S.

USHER (B.). **A Case of Leprosy.**—*Canadian Med. Assoc. Jl.* 1931. May. Vol. 24. No. 5. pp. 693–694. With 2 text figs. [1 ref.] [General Hosp., Montreal.]

The author reports a case of nodular leprosy seen in Canada. The patient is considered to have become infected while in charge of Chinese in France during the great war. A service pension has been granted to him.

L. R.

TISSEUIL (J.). Contribution à l'étude d'un test thermique de guérison clinique de la lèpre. [**The Body Temperature as a Test of Recovery in Leprosy.**—*Bull. Soc. Path. Exot.* 1931. Apr. 15. Vol. 24. No. 4. pp. 272–274. [Gaston Bourret Inst., Nouméa.]

Three cases of leprosy are recorded in which the symptoms had apparently disappeared, but irregularities in the temperature not explained by any other cause, such as tubercle, raised a suspicion that the leprosy had not been cured, so it is suggested that this sign may indicate that cutaneous symptoms may not remain long absent.

L. R.

LE GAC (P.). Fréquence du signe de la percussion douloureuse dans la lèpre. [**The Painful Percussion Sign in Leprosy.**—*Bull. Soc. Path. Exot.* 1931. May 13. Vol. 24. No. 5. pp. 363–366.

The symptom of pain on percussion was first described in leprosy by LE DANTEC in New Caledonia in 1889. It is elicited by percussing with the fingers when acute pain may be produced in areas affected by leprosy in the absence of visible skin lesions, especially over bones,

and later over tendons, ligaments and other tissues. It may occur as hyperaesthesia in areas which subsequently become anaesthetic. The author observed this sign in 70 per cent. of 133 cases examined, most frequently in nodular and mixed cases and least so in macular cases.

L. R.

TOLOSA (Adherbal). Les névrites lépreuses. [**Leprous Neuritis.**]—*Rev. Sud-Américaine de Méd. et de Chirurg.* Paris. 1931. June. Vol. 2. No. 6. pp. 593-603. With 4 text figs. [14 refs.]

The difficulties in the diagnosis of some forms of nerve leprosy are discussed in this paper on general lines as well as the pathology of nerve leprosy. Serial sections indicate that the propagation of the disease is from the periphery upwards in the nerves, but isolated lesions in the nerves are of circulatory origin. A case of leprosy paralysis of the inferior laryngeal nerve is mentioned. When simple laboratory examinations give negative results sections of the tissues may clinch the diagnosis.

L. R.

VILDE (J.). Histopathologische Untersuchungen ueber das Zentralnervensystem der Leprakranken. [**Histopathology of the Central Nervous System in Leprosy.**]—*Ztschr. f. d. gesamte Neurol. u. Psychiat.* 1931. Apr. 18. Vol. 133. No. 1/2. pp. 119-136. With 3 text figs. [Refs. in text.] [German Research Inst. for Psychiatry [K. Wilhelm Inst.] Munich.]

Thinking that too little attention has been paid to the secondary effects of leprosy on the central nervous system the author has examined the brain in fifteen cases, two of which with basal meningitis and one with sepsis were excluded. In the remainder he found no primary lesions due to leprosy, but he noted secondary fatty and arteriosclerotic degenerations of the arteries in some cases. The inner membranes of the brain also showed fibrous thickening, and degenerative and occasionally inflammatory lesions of the parenchyma were observed, but these also were not peculiar to leprosy. They showed themselves chiefly in vacuolation of the ganglion and glia cells. No leprosy bacilli were found in the brains, so the lesions described are attributable to toxic action.

L. R.

MUIR (Ernest). **The Treatment of Leprosy.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1931. Aug. 8. Vol. 25. No. 2. pp. 87-94. [School of Trop. Med. & Hyg., Calcutta.]

Muir's well-known methods of treatment are described. The main point on which he now lays stress, in addition to those formerly advocated by him, is the value of intradermal infiltration of the skin lesions with hydriocarpus esters. He uses for this purpose the ethyl esters washed with steam and iodized to remove their irritating properties as made in the Philippines. From 10 to 20 square inches of skin may be infiltrated by as many as eighty to one hundred punctures with a short guarded needle at one sitting, with the injection of 5 cc. of the ester.

L. R.

PANETH (O.). Zur Chemotherapie der Lepra. [**Treatment of Leprosy.**]
—*Arch. f. Schiffs- u. Trop.-Hyg.* 1931. Aug. Vol. 35. No. 8.
pp. 467-470. [7 refs.]

The author records his experience in Sumatra with the use of thymol, krysolgan, sanocrysin and chaulmoogra derivatives. The first three he found to be useless, but chaulmoogra ethyl esters in the form of antileprol was more effective in early cases treated for long with large doses. Unfortunately the early cases tend to be hidden until too late to get the best results. On theoretical grounds he suggests the use of silver preparations; these he is now testing.

L. R.

DIKSHIT (B. B.) & ROW (Rao Sahib T. Madhava). **A Preliminary Note on the Actions and Uses of "Alepol."**—*Indian Med. Gaz.* 1931. June. Vol. 66. No. 6. pp. 317-320. With 6 figs. on 1 plate. [2 refs.] [Med. College, Vizagapatam.]

The authors found alepol unirritating to the tissues, while rabbits could tolerate at least 25 mgm. per kilo and cats showed no appreciable effects after 150 mgm. per kilo hypodermically. Orally it had some irritant action on the gastro-intestinal tract, and intravenously it lowered the blood pressure and it has marked haemolytic properties. In leprosy it gave very good results in some cases, but no improvement occurred in others; a statement based on only 9 cases treated during seven months.

L. R.

NOLASCO (J. O.). **Local Effects of Infiltration with Iodized Ethyl Esters of Hydnocarpus wightiana Oil in Non-Lepers.**—*Jl. Philippine Islands Med. Assoc.* 1931. June. Vol. 11. No. 6. pp. 219-225. With 3 text figs. [1 ref.]

The effects of infiltration of the skin of non-lepers with hydnocarpus esters have been studied by histological examination of the treated tissues excised after twenty and thirty-four days respectively. Definite cellular reaction with large mononuclear cells loaded with yellowish globules were found, which can persist over nine months, but were absent in control injections with salt solutions. The sebaceous glands became atrophied in areas infiltrated for seven and a half months.

L. R.

STEIN (A. A.). Ueber die Lokalbehandlung der Leprageschwüre. [**Local Treatment of Leprous Ulcers.**]—*Dermat. Woch.* 1931. Aug. 22. Vol. 93. No. 34. pp. 1345-1347. With 2 text figs. [2 refs.]

Working in Russia the author reports good effects in healing old leprosy ulcers on the legs by applying poultices with 10 per cent. magnesium sulphate to reduce the pus formation, followed by an

ointment containing 10-25 per cent. of the same salt. Healthy granulations soon appear followed by healing, which lessens the danger of secondary septic infections.

L. R.

MENAUT. Le traitement de la lèpre d'après la méthode de Pen. [**Treatment of Leprosy by Pen's Method.**—*Bull. Soc. Méd.-Chirurg. Indochine.* 1930. Aug.-Sept. Vol. 8. No. 8/9. pp. 799-805.]

In 1907 a leprosy centre was discovered in a forest area in Cambodia, where a special treatment was carried out by Kruv PEN, who was illiterate. The author found the medicine contained sixteen ingredients, including Krap-Krabao, the local name for *Hydnocarpus anthelmintica*, which was doubtless the active principle. Certain substances, including copper sulphate, were also applied externally. The degree of benefit resulting is uncertain.

L. R.

GOHAR (M. A.). **Vaccine Treatment of Leprosy.**—*Jl. Trop. Med. & Hyg.* 1931. June 15. Vol. 34. No. 12. pp. 166-168. [11 refs.] [Bact. Dept., Faculty of Med., Cairo.]

The author reports favourable effects in nodular leprosy only following the injection of bacillary suspensions made from nodules, together with other saprophytic organisms cultivated from nodules.

L. R.

RUBINO (M. C.). Séro-diagnostic de la lèpre par l'agglutino-sédimentation des globules de mouton formolés. [**Serodiagnosis of Leprosy.**—*Ann. Inst. Pasteur.* 1931. Aug. Vol. 47. No. 2. pp. 147-172. With 1 text fig. [16 refs.]

— Séro-diagnostic de la lèpre par la agglutino-sédimentation des globules rouges de mouton formolés.—*Bull. Acad. Méd.* 1931. June 2. Year 95. 3rd Ser. Vol. 105. No. 21. pp. 890-893.

This is a comprehensive paper on Rubino's agglutination-sedimentation test with formolized sheep's red corpuscles in which minute details of the technique are given and the results of an investigation in MARCHOUX's laboratory in Paris are recorded. He comes to the following conclusions. The sensitiveness of the reaction was clear and it was never obtained in any condition except leprosy, for the serum of lepers contains a specific substance which causes rapid agglutination, and sedimentation of formolized sheep's red corpuscles. Certain human sera contain hetero-agglutinins sedimenting indifferently natural and formolized sheep's corpuscles. These can be removed by the use of unformolized corpuscles. A reaction is positive if sedimentation is produced in less than an hour with the formolized corpuscles or occurs to a much greater degree with them than in control tubes, but is otherwise negative. In 36 cases of leprosy 27 were positive, 7 negative and 2 doubtful, but all of 304 sera from various other diseases were negative, with one exception in a patient with thickened nerves who ultimately was found to have nerve leprosy. The second paper is a brief account of the same work.

L. R.

ADANT (Max). La réaction de Botelho dans la lèpre. Technique d'Itchikawa et Baum. [**The Reactions of Botelho and Rubino in Leprosy.**]—*C.R. Soc. Biol.* 1931. June 30. Vol. 107. No. 21. pp. 907-908. [4 refs.]

——. La réaction de Rubino dans la lèpre.—*Ibid.* pp. 909-911. [10 refs.] [Bact. Lab., Elisabethville, Belgian Congo.]

RUBINO (C.). Séro-diagnostic de la lèpre par l'agglutino-sédimentation des globules rouges de mouton formolés. A propos d'une note de M. Max Adant.—*Bull. Soc. Path. Exot.* 1931. July 8. Vol. 24. No. 7. pp. 519-521. [1 ref.]

In the first of these notes the author obtained 10 positive reactions in 14 lepers, or 71·4 per cent., and he quotes LE GAC'S 72 per cent. and da Silva ARAUJO'S 50 per cent. of positive results of their tests. Among 138 non-lepers all were negative. In the second note he records his results with Rubino's test with formolized corpuscles and he reports 9 positive reactions in 14 negro lepers, or 64 per cent.

In a note on the papers of Adant Rubino points out that the results of the former are not comparable with those of Rubino's new technique.

I.. R.

LANDEIRO (Fausto). Sédimentation globulaire dans la lèpre. [**Red Cell Sedimentation in Leprosy.**]—*Arquivos Inst. Bact. Camara Pestana.* 1930. Vol. 6. No. 2. pp. 167-171. With 1 chart in text. [7 refs.] [Camara Pestana Inst., Lisbon.]

This paper deals with the simple red corpuscle sedimentation rate in citrated blood. The author examined the blood of 50 lepers and he obtained sedimentation rates of 68 in nodular, 26 in nerve and 56 in mixed cases of leprosy. He agrees with other workers that the rate is much higher in leprosy than in healthy persons, and is especially high in the nodular type.

L. R.

GOMES (J. M.). Denuncia serologica da lepra latente. [**Unmasking of Latent Leprosy.**]—*Brasil-Medico.* 1931. July 18. Vol. 45. No. 29. pp. 661-663. [Hyg. Inst., São Paulo.]

The author has for several years performed the test of complement fixation in patients suspected of leprosy infection, using de-fatted Deycke's bacillus as antigen. He speaks very highly of its reliability. Some cases of active tuberculosis give a positive reaction, and a few "regarded as leprosy on account of a positive reaction proved to be latent tuberculosis." If, however, the preparation of the antigen be very carefully carried out, only the former (active tuberculosis) will mar the value of the test and then very occasionally. Of 148 contacts 63 reacted positively (42·5 per cent.) and after taking potassium iodide, 2 gm. daily for a week, another 16 previously negative became positive (53·3 per cent. in all). Brief notes are given of 13 patients, all of whom had shown signs of the disease in the past, from 3 months to 4 years 8 months previously. None of these showed bacilli on examination of the nasal mucus; 9 were positive on testing the serum direct for complement fixation, and the other 4 were also positive after taking the potassium iodide (one giving ++++). One patient, a man of 24 years, had showed slight signs 52 months before (his sister was leprosy) and his serum gave ++, reduced to + after KI; this anomalous

result is to be the subject of a special communication. The author records these cases as a plea for systematic examination by complement fixation of contacts and suspects presenting no obvious signs, and, if the results are negative, a retest after administration of potassium iodide before a final opinion is expressed.

H. H. S.

ALI (Mohamed) & EL-DALGAMONY (A.). **The Result of the Seriological [sic] Examination of 257 Lepers and 527 Non-Lepers for Syphilis by the Wassermann's and the Kahn's Flocculation Tests.**—*Jl. Egyptian Med. Assoc.* 1931. June. Vol. 14. No. 6. pp. 394-399. [22 refs.]

After references to the literature, and pointing out that the Kahn flocculation test seems to give a negative reaction in the sera of non-syphilitic lepers which are otherwise positive by the Wassermann test, they record the results by both tests with the sera of 257 lepers and 527 non-lepers. They found that the Kahn test gave less positive reactions in leprosy than the Wassermann and in non-leprosy cases the opposite result was observed.

L. R.

BADGER (L. F.). **Significance of Positive Wassermann and Kahn Reactions in Leprosy.**—*Public Health Rep.* 1931. Apr. 24. Vol. 46. No. 17. pp. 957-970. [24 refs.]

After references to earlier literature tests with the sera of 207 lepers over ten years of age with Kolmer's antigen for the Wassermann and Kahn's for his test are dealt with. The author concludes that positive reactions were obtained in an abnormally high proportion of the cases, nearly twice as frequently in females as in males and more often in patients under than over twenty. Plus reactions were three times as high in lepers as in a control group and definite changes in the serum reaction were correlated with clinical variations in the leper patients.

L. R.

HÉRIVAUX (A.). **Les groupes sanguins dans la lèpre. [Blood Groups in Leprosy.]**—*Bull. Soc. Path. Exot.* 1931. July 8. Vol. 24. No. 7. pp. 618-619. [Pasteur Inst., Antananarivo.]

The blood of 78 patients with nodular or nerve leprosy were examined in Madagascar and fewer lepers than normal were found to belong to group AB, but more to groups B and O.

L. R.

i. OTA (M.) & SATO (S.). **Culture de deux variétés d'un bacille acido-résistant à partir du sang et du léprome de lépreux (*Mycobacterium aurantiacum* et *M. album*).** [Cultures from Lepers.]—*C.R. Soc. Biol.* 1931. July 16. Vol. 107. No. 23. pp. 1062-1063.

ii. — & —. **Culture du bacille tuberculeux à partir d'un léprome typique et d'un ganglion lymphatique de lépreux.**—*Ibid.* pp. 1064-1065. [1 ref.] [Dermat. Clinic, Tohoku Imperial Univ., Sendai, Japan.]

i. In the first of these short notes the authors report having made cultures from the blood of 54 lepers on media suitable for the growth

of acid-fast organisms. Half of the patients were also suffering from tuberculosis. No tubercle bacilli were obtained, but from two acid-fast bacilli named *Mycobacterium aurantiacum* and *M. album* were grown. On inoculating white rats with these organisms swelling and inflammation of the nose was produced with discharge of masses of acid-fast bacilli, so they consider them to be lepra bacilli.

ii. In the second note they record the cultivation of Koch's tubercle bacillus from a typical leprous nodule, which on injection subcutaneously into guineapig produced necrosis of the tissues. They also obtained the tubercle bacillus from the axillary gland of a leper who was suffering from pulmonary tuberculosis.

L. R.

HENDERSON (John M.). **Preliminary Observations on an Acid-Fast Organism isolated from Human Leprous Lesions.**—*Indian Jl. Med. Res.* 1931. July. Vol 19. No. 1. pp. 145–153. With 7 coloured figs. on 2 plates. [3 refs.] [School of Trop. Med. & Hyg., Calcutta.]

This is an account of an acid-fast bacillus isolated by E. MUIR from a case of leprosy by Shiga's method of culture, which only showed visible growth eight months after insemination on the culture tubes. It now grows readily on Petroff's medium and on glycerine broth under partially anaerobic conditions as a yellow film, but growth is most abundant in the presence of oxygen. Stained by Ziehl Nielsen's method it shows beaded red rods, but if first treated with zylol and absolute alcohol many of the rods stain blue. Attempts to demonstrate the presence of bacterial antibodies in the sera of lepers failed, but this does not prove that it is not the organism of leprosy. It was only obtained by MUIR once in twenty-three trials from human leprous tissues, and the conclusion is come to that "its relationship to *M. leprae* (Hansen) is at the moment completely undetermined."

L. R.

NINNI (C.) & MONALDI (T. de Sanctis). **Formes cachées des tuberculosis dans la lèpre humaine. [Larval Forms of Tuberculosis in Leprosy.]**—*C.R. Soc. Biol.* 1931. July 3. Vol. 107. No. 22. pp. 981–983. [1 ref.]

In view of the frequency with which lepra bacilli occur early in leprosy in the lymphatic glands the authors have tried injecting leprous material directly into the glands of guineapigs. On examining the animals killed after various periods of time they found only enlargement and congestion after 25 days, some points of necrosis after 45 days and enlargement and caseation at the end of 60 days, but only slight enlargement after 90 days. Acid-fast bacilli were numerous after 4 days, but gradually decreased and disappeared in 90 days. From the 25th to the 60th day the organs of the inoculated animals showed typical tubercular lesions, but no such lesions were found after 90 days, and human tubercle bacilli were cultivated in the earlier periods only.

They conclude that the inoculation of apparently pure leprous material into the glands of guineapigs produced an atypical tuberculosis in the animals, such as is frequent in leprosy.

L. R.

BASOMBRIO (Guillermo A.). Estudio de las adenopatías en la lepra.—*Semana Méd.* 1931. May 7. Vol. 38. No. 19 (1947). pp. 1213-1234. With 8 text figs. [42 refs.]

KIRK (N. T.). Neurotrophic Changes in Leprosy.—*Milit. Surgeon.* 1931. July. Vol. 69. No. 1. pp. 18-25. With 6 text figs. [2 refs.]

TISSEUIL (J.). Au sujet d'un cas de léprides à forme d'érythème noueux.—*Bull. Soc. Path. Exot.* 1931. May 13. Vol. 24. No. 5. pp. 366-369. [1 ref.]

TISSEUIL (J.). Stade tuberculoïde intermédiaire dans l'évolution d'un cas de lèpre.—*Bull. Soc. Path. Exot.* 1931. June 10. Vol. 24. No. 6. pp. 453-458. [Gaston Bourret Inst., Nouméa.]

TOULLEC & RIOU. Un cas de lèpre atypique avec prédominance des lésions cutanées.—*Marseille-Méd.* 1931. Mar. 25. Vol. 68. No. 9. pp. 414-416.

VAN DEN BRANDEN (F.). Premier cas de lèpre diagnostique au Congo Belge chez un européen.—*Ann. Soc. Belge de Méd. Trop.* 1931. Mar. 31. Vol. 11. No. 1. pp. 9-10.

TROPICAL OPHTHALMOLOGY : A REVIEW OF RECENT ARTICLES.—XVI.*

CONJUNCTIVA.—RAGAIN¹ found that in Cambodia acute infectious inflammations of the conjunctiva occur with the greatest frequency at the commencement of the rainy season and are specially common throughout its duration. The peak incidence is seen in June. For this distribution he blames flies, pollen and wind. Children are the chief sufferers and Koch-Weeks infection is the most common cause (56 per cent.). Even simple and benign cases may be complicated by the injudicious application of "native remedies." In an interesting paper TALBOT² has described seasonal epidemics of gonorrhoeal ophthalmia which occur in the oasis of Gabès, south of Tunis. These epidemics appear in autumn at the time when nomadic merchants and labourers reinforce the local population in order to gather the olive and date crops. Such nomads constitute the source of infection. Flies apparently play no part in the dissemination of the disease which seems to be conveyed directly from person to person. The author refers to his experience of similar epidemics. One of these occurred in Tonking in 1917 amongst Annamite and Tonkinese recruits who were collected in camp previous to embarkation for the Western front. Many cases of partial and of total blindness resulted, but the unfortunate sufferers were considered to have inoculated themselves purposely to avoid service and were discharged without pension or compensation.

Trachoma.—OLITSKY and TYLER³ report two instances of the experimental direct transmission of trachoma to normal monkeys (*Macacus rhesus*) by gently rubbing the conjunctiva with swabs containing fresh secretion taken from a trachomatous patient. The infected monkeys presented typical granulomatous changes after the lapse of thirteen days. Tissues taken from one of these monkeys yielded cultures of *B. granulosis*. The same bacterium was isolated from the conjunctival tissues of the patient from whom this monkey was infected, and cultures of it injected into three other monkeys (*Macacus rhesus*) induced the changes of experimental trachoma in from nine to eleven days.

MACCALLAN⁴ has contributed a valuable paper on the disease. He states that the most reliable method of arriving at the incidence of trachoma in a more or less trachomatized country is a systematic inspection of the primary schools. In 1914 he found in Egypt 92 per cent. of scholars infected. Such conditions, however, may not in every case represent the true incidence of the disease in the country or town in which the examination was made, since the majority of cases tend to cicatrize and after some years it may prove difficult to detect evidence

* For the fifteenth of this series see Vol. 28, pp. 475-481.

¹ RAGAIN (L.). Les conjonctivites infectieuses au Cambodge.—*Bull. Soc. Méd.-Chirurg. Indochine*. 1931. Apr. Vol. 9. No. 4. pp. 247-249. With 1 graph & 1 chart. [Ophthalmic Inst., Phnom-Penh.]

² TALBOT. Conjonctivites saisonnières épidémiques à gonocoques dans l'oasis de Gabès (Sud tunisien).—*Arch. Inst. Pasteur de Tunis*. 1930. Dec. Vol. 19. No. 4. pp. 451-460. [1 ref.]

³ OLITSKY (Peter K.) & TYLER (Joseph R.). Direct Transmission of Human Trachoma to the Monkey.—*Science*. 1930. May 30. Vol. 71. No. 1848. p. 564. See also *Studies from Rockefeller Inst. Med. Res.* 1931. Vol. 75. pp. 1-2. [3 refs.]

⁴ MACCALLAN (A. F.). The Epidemiology of Trachoma.—*Brit. Jl. Ophthalm.* 1931. July. Vol. 15. No. 7. pp. 371-411.

of the pre-existing disease. [It should be remembered, too, that the diagnosis between trachoma and folliculosis and other abnormal conjunctival conditions may prove particularly difficult in young subjects.] As a source of infection a trachomatous child is more dangerous than a trachomatous adult. Treatment in schools is the most important agent in prophylaxis as it renders the pupil non-contagious. The author comments on the curiously uneven distribution of the disease; thus, the inhabitants of Mecca are comparatively free, though their neighbours in Nejd are heavily infected. There is practically no rain in Mecca and absolutely no cultivation. In Nejd rain is prevalent and cultivation extensive. In Egypt a rise of conjunctival disease coincides very accurately with a rise in climatic temperature. Most of the ophthalmia is gonococcal, usually non-venereal. A vast increase in the number of flies occurs at the same time. An increase in the patients requiring treatment for trachoma soon follows the epidemic. People living in the neighbourhood of the site of an ancient ruined city, where there is considerable fine dust formed from crumbling bricks, suffer more severely than those who are exposed to the irritation of the coarser desert sand.

WILSON,⁵ too, has published an informative paper on certain aspects of the aetiology of the disease. He remarks upon the difficulty of securing a universally accepted definition of trachoma. There exists in all cases of trachoma a stage during which it is impossible to state the diagnosis definitely because the appearances are simply those of any ordinary simple chronic conjunctivitis. As regards the causative organism, interpretations of positive inoculations in animals are particularly open to criticism. In the light of recent research one should not entirely disregard the aetiological relationship of inclusion bodies to the disease; these may indicate the presence of a virus in their immediate vicinity. With respect to *B. granulosis* he and his fellow workers in Egypt have only obtained negative results although they followed closely the technique recommended by NOGUCHI. He thinks that the evidence in favour of this organism being the cause of trachoma is not convincing at present. But its discovery, when we understand the conditions better, may yet prove the key which will open the way to an accurate knowledge of the disease and its remedy.

WEISS⁶ succeeded in isolating from trachomatous tissues a small bacillus which corresponded to the description by NOGUCHI of the *B. granulosis*. A subconjunctival inoculation of the cultures in two monkeys (*Macacus inuus*) produced fine granulations after the lapse of fourteen days. Thirty-three days later the symptoms began to disappear. A subculture from one of NOGUCHI's original preparations failed to infect three human volunteers and one monkey. OLITSKY, KNUTTI and TYLER⁷ have induced a characteristic granular conjunc-

⁵ WILSON (Rowland P.). A Discussion on the Aetiology of Trachoma with Special Reference to Bacterium Granulosis (Noguchi).—*Brit. Jl. Ophthalm.* 1931. Aug. Vol. 15. No. 8. pp. 433-446. [43 refs.]

⁶ WEISS (Charles) with the Collaboration of O. Reymond DE GENTILE & E. CONSEIL. Lésions conjonctivales, consécutives à l'inoculation de *Bacterium granulosis* (Noguchi).—*Arch. Inst. Pasteur de Tunis*. 1930. Dec. Vol. 19. No. 4. pp. 433-434.

⁷ OLITSKY (P. K.), KNUTTI (R. E.) & TYLER (J. R.). Transmission and Cultivation Experiments with Human Trachoma and the Experimental Disease in Monkeys.—*Jl. Experim. Med.* 1931. July 1. Vol. 54. No. 1. pp. 31-40. [7 refs.] [Rockefeller Inst. for Med. Research, New York.]

titivitis in *Macacus rhesus* monkeys by either a single subconjunctival injection or by repeated conjunctival swabbings with material obtained from patients suffering from long-standing trachoma. Pathogenic strains of *B. granulosis* were successfully cultivated from six out of the eleven patients from whom this material was taken, and the organisms were recovered from the infected monkeys. They found that material taken from human trachoma and from monkeys suffering from the experimental disease and cultures of *B. granulosis* all induced in the *Macacus rhesus* the same clinical and pathological changes when injected subconjunctivally. These changes closely resembled the follicular stages of human trachoma.

BELOT⁸ has investigated the intradermal reaction to trachoma antigen described by TRICOIRE. He examined 400 trachomatous and 100 non-trachomatous patients; 59 per cent. of the former and 52 per cent. of the latter gave a positive reaction. Its value as a diagnostic aid is therefore not great. The author considers that trachoma is a purely local disease and cannot be expected to produce humoral changes, nor is vaccine therapy likely to prove useful in its treatment. NEUMANN⁹ advocates the use of iodine in the treatment of the disease, especially when advanced and complicated by pannus and other corneal troubles. The drug is applied to the everted tarsal and fornical conjunctiva with a wisp of wool twisted on to a glass rod. 10 per cent. tincture of iodine is used and is smeared on until the wool holding the iodine is dry. Excess of iodine is then wiped off with dry cotton-wool and the whole area is smeared with a simple ointment. Reaction reaches its maximum the day after the application and usually is completed by the fourth day. Treatment may then be repeated if desired. Copper stick and conjunctival massage are used in conjunction. EL-KATTAN¹⁰ claims to have obtained good results by injecting a vaccine into the fornix. The vaccine is prepared by repeatedly macerating small pieces of trachomatous tissues in saline. The supernatant fluid obtained from each maceration is mixed and then diluted until its turbidity equals that of a 10,000 million per cc. suspension of staphylococci. The emulsion is heated to 60° C. for one hour and one cc. is then added to fifteen cc. of sterile inactivated horse serum. Half a cc. of this serum is injected every five or six days.

The *Revue Internationale du Trachome* for April 1931 contains a note by MACCALLAN¹¹ on the small pits which are found at the periphery of the upper portion of the cornea in old trachomatous cases. These were first described by HERBERT in 1904 and MACCALLAN considers them to be peculiar to trachoma. VEJDovsky¹² reports favourably upon a modified Denig's operation for trachomatous

⁸ BELOT (R.). Etude critique de l'intra-dermoréaction trachomateuse de Tricoire, basée sur 500 cas.—*Arch. Méd. et Pharm. Nav.* 1931. Jan.-Feb.-Mar. Vol. 121. No. 1. pp. 19-22. [1 ref.]

⁹ NEUMANN (J.). Iodine in the Treatment of Trachoma.—*Brit. Jl. Ophthalm.* 1931. Sept. Vol. 15. No. 9. pp. 518-524. [17 refs.]

¹⁰ EL-KATTAN (M. Azmy). An Introduction to Trachoma Therapy with Specific Antigen.—*Jl. Egyptian Med. Assoc.* 1931. July. Vol. 14. No. 7. pp. 405-408. With 3 coloured plates.

¹¹ MACCALLAN. Fossettes marginales de Herbert et les rosettes cornéennes du trachome.—*Rev. Internat. du Trachome.* 1931. Apr. Vol. 8. No. 2. pp. 53-54. [1 ref.]

¹² VEJDovsky (V.). Traitement opératoire du pannus trachomateux par l'implantation de muqueuse buccale (procédé de Denig).—*Rev. Internat. du Trachome.* 1931. Apr. Vol. 8. No. 2. pp. 57-62. [20 refs.]

pannus. The operation consists in performing a peritomy above and in grafting into the wound a strip of buccal mucous membrane. The peritomy incision is carried well down on to the sclera and the graft is stitched with fine sutures to the limbus below and to the bulbar conjunctiva above. [Such a graft should diminish the pressure of the trachomatous lid on the cornea since it must lift slightly the diseased tarsal conjunctiva during movements of the lid.] MIKAELIAN¹³ records experiments made with respect to the intradermal reactions of trachomatous and non-trachomatous subjects to cultures of Noguchi's bacterium. No specific reaction was obtained. SCHOUSBOÉ¹⁴ contributes a lengthy paper on the treatment of the disease. His main points are that one should try to avoid the occurrence of excessive cicatrization and to deal appropriately with secondary infections. He dislikes copper in stick form, but uses it freely in solution. He prefers silver nitrate for the papillary varieties of the disease and uses it up to 10 grains to the oz. He has found subconjunctival injections of cyanide of mercury (1-5,000) useful in the treatment of trachomatous keratitis. He realizes the importance of treating any associated syphilitic infection. The issue for July 1931 contains several articles, mostly short. HÜBIN and HUBERT¹⁵ discuss the question of an increase of trachoma in Belgium owing to an influx of infected immigrants. These immigrant workmen are often insanitary in their habits and have proved sources of infection in their lodgings. MORAX¹⁶ states that he has been unable to cultivate the *B. granulosis* from material obtained from trachomatous Algerians. He notes the remarkable absence of any bacterial growth in his cultures provided the patient was free from any secondary infection. MORAX and NIDA¹⁷ found that the *B. granulosis* isolated by LUMBROSO at Tunis corresponds generally in its characters with that of NOGUCHI and OLITZA. SÉDAN¹⁸ reports his experience of Tricoire's intradermal reaction. 40 out of 64 trachomatous patients gave a positive reaction, 14 were doubtful and 10 negative. Tuberculous and syphilitic patients reacted positively.

CORNEA.—*Keratomalacia*.—PUSCARIU and NITZULESCU¹⁹ state they have found but little pigmentation of the conjunctiva in xerosis cases seen at Jassy. Recently, however, noticeable pigmentation in a gipsy led them to examine other gipsy patients, and they found that gipsies usually show a brown-blackish tinge of the portion of the bulbar conjunctiva corresponding to the palpebral aperture. They are inclined

¹³ MIKAELIAN (R. C.). Le bacille de Noguchi donne-t-il une intradermo-réaction spécifique chez les trachomateux?—*Rev. Internat. du Trachome*. 1931. Apr. Vol. 8. No. 2. pp. 64-68.

¹⁴ SCHOUSBOÉ. Traitement médical du trachome.—*Rev. Internat. du Trachome*. 1931. Apr. Vol. 8. No. 2. pp. 70-106. [36 refs.]

¹⁵ HÜBIN (R.) & HUBERT (J.). Le trachome en Belgique et la main-d'oeuvre étrangère.—*Rev. Internat. du Trachome*. 1931. July. Vol. 8. No. 3. pp. 126-132.

¹⁶ MORAX (V.). Recherches bactériologiques sur le trachome en Algérie.—*Rev. Internat. du Trachome*. 1931. July. Vol. 8. No. 3. pp. 133-134.

¹⁷ MORAX & NIDA. Etude comparative de quelques souches de bactérium *granulosis*.—*Rev. Internat. du Trachome*. 1931. July. Vol. 8. No. 3. pp. 136-140.

¹⁸ SÉDAN (Jean). Recherches sur l'intra-dermo-réaction du trachome.—*Rev. Internat. du Trachome*. 1931. July. Vol. 8. No. 3. pp. 153-158.

¹⁹ PUSCARIU (Elena) & NITZULESCU (Julius). On the Pigmentation of the Conjunctiva in Normal Individuals and in Cases of Keratomalacia in Adults.—*Brit. J. Ophthalm.* 1931. Jan. Vol. 15. No. 1. pp. 18-22. [16 refs.]

to believe that the pigmentation in xerophthalmia is due to melanin and is a special reaction, the intensity of which varies according to the particular capacity of the tropho-pigmentary tissue of the race; naturally it is least in the white races.

LENS.—*Cataract.*—PÉRETZ²⁰ describes some of the difficulties experienced by the surgeon when operating for cataract in Egypt. The prevalence of conjunctival diseases and of dacryocystitis renders measures against wound infection specially difficult and important. Cicatricial changes in the eyelids, blepharophimosis and symblepharon, cause difficulty in obtaining sufficient room. Dense leukomata may interfere with the surgeon's view of the knife whilst making the section and may spoil the effect of a technically successful operation. He states that Egypt is the country of glaucoma and that forty per cent. of aged patients there suffer from glaucoma. The co-existence of glaucoma and cataract is very common; frequent examinations should therefore be made of sufferers from incipient cataract, and a preliminary iridectomy should be performed directly a suspicion of glaucoma is aroused. PÉRETZ considers the hot season unfavourable for operation and prefers not to operate between June and September. KIRBY and NEWELL²¹ have conducted a careful investigation into the efficacy of lens protein therapy in cataract, and were unable to satisfy themselves that the patients so treated were in any way benefited.

FLEMING²² has described the technique advocated by him for the extraction of senile cataract. Preliminary capsulotomy is performed by opening the lens capsule with a Ziegler's knife. A broad "bridge-flap" of conjunctiva is fashioned and the lens is "dipped" by stroking with an iris repositor the sclera beneath the flap. This instrument is employed to elevate the flap whilst the lens is made to present by curette pressure upon the cornea. The repositor is discarded after presentation of the nucleus and delivery is aided by rotating the lens with a needle. Cortical remnants are washed out and replacement effected by irrigation. Fleming considers it safe to omit an iridectomy in the vast majority of cases operated on by this method.

RETINA.—*Detachment of the Retina.*—DOGGART & SHAPLAND²³ have reported on 75 cases of simple detachment of the retina treated at Moorfields Eye Hospital by Gonin's method. Of the 75 patients operated upon, 24 were discharged with the retina in place and in possession of a full visual field; 12 cases showed some improvement; and 39 were either unchanged or worse. This is an encouraging record for such a desperate disease. Before operating it is essential to locate accurately the hole or holes in the membrane; this requires a full mydriasis so that the extreme peripheral region of the fundus may

²⁰ PÉRETZ (H.). A Short Study of the Complications of Cataract Extraction in Egypt with Some Practical Suggestions.—*Brit. Jl. Ophthalm.* 1931. Jan. Vol. 15. No. 1. pp. 28-33. [3 refs.]

²¹ KIRBY (Daniel B.) & NEWELL (W. Giles). Investigations of Lens Protein Therapy in Cases of Cataract.—*Trans. Amer. Acad. Ophthalm. & Otolaryngology.* 1930. pp. 309-322.

²² FLEMING (Norman). Extraction with Conjunctival Bridge.—*Proc. Roy. Soc. Med.* 1931. Apr. Vol. 24. No. 6. pp. 756-757 (Sect. Ophthalm. pp. 26-27).

²³ DOGGART (J. H.) & SHAPLAND (C. D.). Simple Detachment of the Retina. With a Report on 75 Cases treated at Moorfields Eye Hospital by Gonin's Method.—*Brit. Jl. Ophthalm.* 1931. May. Vol. 15. No. 5. pp. 257-271. With 8 text figs. [43 refs.]

be explored. It is necessary to ascertain the distance of the hole from the ora serrata and also the meridian of the globe which passes through the middle of the hole. The ora serrata may be assumed to lie 8 mm. from the limbus and the distance of the hole from the ora can be estimated in disc diameters (1.5 mm.). The Moorfields technique closely follows that of GONIN. Two spots at diametrically opposite points of the limbus which are in line with the estimated site of the hole are tattooed with Indian ink. After cocaineization, novocaine and adrenalin is injected beneath the conjunctiva at the place selected for puncture and a knotted guiding thread is passed through the episcleral tissue at that limbal pigment mark which is the further remote from the retinal hole. The conjunctiva is incised at a distance of about 12 mm. from the other pigment mark, Tenon's capsule is opened and the sclera is bared over the site of the proposed puncture. A Desmarres retractor, in the centre of which a hole has been punched, is used to retract widely the conjunctival wound. The guiding thread is passed through the hole in the retractor and is arranged so as to traverse both tattoo marks. Its prolongation will thus cross the site of the retinal hole. The previously estimated distance of the hole from the limbus is measured with callipers and the supposed site is marked on the sclera by one of the points which has been dipped in sterilized Indian ink. Conjunctival sutures are inserted and the guiding thread is withdrawn. An electric cautery at white heat now sears a way through the sclera at the point selected, and, as soon as the subretinal fluid has escaped, the cautery is again raised to white heat, plunged through the opening in the sclera and immediately withdrawn. The average depth of penetration is 1 cm. and the duration two seconds. The conjunctival sutures are quickly tied off and a bandage is applied. The patient is nursed with the head so placed that the situation of the hole is the most dependent part of the eye. Both eyes are bandaged and absolute rest under atropine is maintained for eleven days in successful or hopeful cases.

GENERAL DISEASES.—*Onchocerciasis*.—HISSETTE²⁴ has published a note on the occurrence of onchocerciasis in certain Congo districts. He found that twenty per cent. of those infected had lost their sight ; but he does not mention the pathological changes [probably uveitis] which caused the blindness. The eye troubles were greatly ameliorated by the removal of the filarial cysts.

Trypanosomiasis.—HISSETTE²⁵ describes the optic atrophy, which, even in the absence of any arsenical treatment, may occur in the course of sleeping sickness. Arsenical treatment is a fruitful cause of the complication. Even partial atrophy causes great loss of visual acuity. In simple forms the disc is blanched and has clean-cut edges, whilst the vessels show little or no shrinking. Softening of the disc edges signifies a previous high intracranial pressure. A progressive contraction of the visual field is a more sure indication of an advance of the disease than any afforded by ophthalmoscopic examination. Patients who are the subjects of any form of intoxication are specially liable to contract optic atrophy. Tryparsamide should be administered, and, if there is any swelling of the disc, spinal puncture should be performed.

²⁴ HISSETTE. Sur l'existence d'affections oculaires importantes d'origine filarienne dans certains territoires du Congo.—*Ann. Soc. Belge de Méd. Trop.* 1931. Mar. 31. Vol. 11. No. 1. pp. 45-46.

²⁵ HISSETTE (Jean). Affections oculaires dans la trypanosomiase.—*Ann. Soc. Belge de Méd. Trop.* 1930. Dec. 31. Vol. 10. No. 4. pp. 423-428.

Special attention must be paid to maintaining the nutrition of the patient. Nitrite of amyl or nitrite of soda may prove helpful.

MISCELLANEOUS.—DEPLANCHE²⁶ has recorded his experiences of eye disease at Abidjan on the Ivory Coast of Africa. Refraction errors account for the majority of consultations by Europeans, and the author agrees with other observers that the amplitude of accommodation in Europeans resident in the tropics suffers diminution and that symptoms of asthenopia appear in them more readily than when living under the more congenial conditions of a temperate climate. Myopia is rare amongst the native population; hypermetropia and hypermetropic astigmatism according to rule is more common. Trachoma is practically non-existent, but gonorrhoeal ophthalmia, both acute and chronic, is rife. The infection nearly always has a genital origin. Leukomata, which result from gonorrhoeal ophthalmia, smallpox, and leprosy, are prevalent. Iritis usually occurs in an insidious form with cyclitis and choroiditis, and often leads to seclusion of the pupil. Cataract is frequently seen, but is very often traumatic or complicated. Few senile cataracts, favourable in every respect for operation, are encountered. Lachrymal affections account for only a small percentage of the admissions. Leprosy and venereal infections constitute the main causes of the ocular troubles in the district. LEGER²⁷ quotes HOWARD as estimating that in China half a million persons are totally blind, five million are practically blind and fifteen million suffer from defective sight. Lack of proper hygiene leads to trachoma and other conjunctival diseases. Syphilis, too, is responsible for much blindness, as it causes iritis which leads to pupil occlusion or to secondary glaucoma. In some parts of the country xerosis and keratomalacia are as harmful as trachoma. Smallpox also is a common cause of blindness. Destructive inflammations frequently result from the introduction of a virulent infection during the attempts of unskilled persons to deal with mild ocular disorders.

The Annual Report of the Madras Government Ophthalmic Hospital for the year 1930²⁸ contains, for various reasons, a less full account than usual of the hospital activities; but, nevertheless, much useful information can be gathered from its pages. Both in-patients (3,720) and out-patients (28,470) showed an increase over the previous year. The total number of cataract operations was 1,676; Barraquer's operation being performed on 218 patients. The "bridge-flap" was adopted in the majority of the 1,327 capsulotomy operations. The work of the refraction room is growing and 3,129 patients were treated for errors of refraction. 105 cases of optic atrophy were examined, and 33 cases of choroidal disease. 2,679 patients were treated for "superficial punctate keratitis." It is stated that this disease has altered in character and that the majority of the patients showed marked conjunctival redness and swelling with involvement of the preauricular gland. Fine keratic precipitates, too, were common, but gross iritis was never found. Mild cases were

²⁶ DEPLANCHE. Deux années de pratique ophtalmologique en Côte d'Ivoire.—*Bull. Soc. Path. Exot.* 1931. May 13. Vol. 24. No. 5. pp. 406-415. [10 refs.]

²⁷ LEGER (Marcel). Les causes de la cécité en Chine.—*Bull. Soc. Path. Exot.* 1931. Apr. 15. Vol. 24. No. 4. pp. 255-265.

²⁸ MADRAS. Annual Report and Statistics of the Government Ophthalmic Hospital, Madras, for the Year 1930 [WRIGHT (R. E.), Supt.].—26 pp 1931. Madras.

relatively infrequent. Experiments were conducted in the treatment of keratomalacia by concentrated vitamin A. This substance, however, was found to be less efficacious than cod-liver oil. Spring catarrh responded much better to small doses of radium than to large ones. It is noted that propaganda on the prevention of blindness is meeting with appreciation.

The Seventeenth Annual Report of the Ophthalmic Section of the Department of Public Health of the Egyptian Government²⁹ deals with the year 1929. It records an expenditure of £E83,966, and the steady, progressive decrease of blindness amongst the patients attending hospitals shows that good value has been obtained. The percentage has fallen from 15·6 in 1909 to 8·4 in 1929. Purulent ophthalmia causes 75 per cent. of the blindness, and it is stated that 92 per cent. of the population is affected by trachoma. Glaucoma seems to be met with almost as frequently as senile cataract; but more than half the glaucoma is secondary. The report notes the coincident rise of climatic temperature and of hospital attendances of patients suffering from acute ophthalmias. The gonococcus was found in 38 per cent. of the acute ophthalmias.

H. Kirkpatrick.

²⁹ EGYPT : Ministry of the Interior. Department of Public Health. Ophthalmic Section. Seventeenth Annual Report for the Ophthalmic Section, 1929.—42 pp. With 1 folding map. 1931. Cairo.

MALARIA.

JAMES (S. P.), NICOL (W. D.) & SHUTE (P. G.). **On the Prevention of Malaria with Plasmoquine.**—*Lancet*. 1931. Aug. 15. pp. 341–342.

Ten volunteers, all but one students at St. Mary's Hospital, London, were given 0·02 grams of plasmoquine and, on the following day, shortly after taking a second dose, they were bitten by mosquitoes (*A. maculipennis*) heavily infected with the sporozoites of benign tertian malaria. They continued to take plasmoquine, in doses of 0·02 grams, three times a day for 6 days, including the day on which they were bitten, with the result that not one of them became infected. Four control cases, on the contrary, who had no plasmoquine were all attacked by malaria within 14 days. One of these controls was given quinine prophylactically for 8 days but, as usual, when it was stopped it failed to prevent the attack. The authors conclude that "This experiment, and the 15 equally successful trials which preceded it, prove that plasmoquine effectively prevents mosquito-borne malarial infection among a group of healthy individuals who take the prophylactic doses. Quinine lacks this remarkable property . . . From the results of our previous tests, we know that somewhat smaller doses taken over a shorter period are equally effective."

W. Fletcher.

COVELL (G.). **The Present State of our Knowledge regarding the Transmission of Malaria by the Different Species of Anopheline Mosquitoes.**—*Records of the Malaria Survey of India*. 1931. Mar. Vol. 2. No. 1. pp. 1–48. [7 pages of refs.]

Though many species are possible vectors under certain conditions, yet the principal rôle is played in each locality by comparatively few. Infection under laboratory conditions does not prove that a mosquito is an important carrier in nature. The discovery, in nature, of a scanty gut infection in one out of many mosquitoes examined, is of little importance; the discovery of sporozoites, on the other hand, is highly incriminating [but, see SWELLENGREBEL and DE BUCK, below, p. 1018]. The following is a list of the chief malaria-carrying anophelines of the world:

I. *America.*

NORTH AMERICA.

United States

quadrimaculatus (south and east).
maculipennis (Pacific coast).

Mexico

albimanus (coast).
pseudopunctipennis } (highlands).
quadrimaculatus

CENTRAL AMERICA AND WEST INDIES.

albimanus.
tarsimaculatus.

SOUTH AMERICA.

Guiana

albimanus.
albitarsis.

Venezuela

albimanus.
albitarsis.

I. America—continued.

SOUTH AMERICA—continued.

Colombia	<i>albimanus</i> .
Ecuador	<i>albimanus</i> .
Brazil	<i>albitarsis</i> .
	<i>tarsimaculatus</i> .
Argentina	<i>pseudopunctipennis</i> (north-west).
	<i>albitarsis</i> (north-east).

II. Europe.

All countries where malaria occurs	<i>maculipennis</i> .
Balkans	<i>superpictus</i> .
Italy and Macedonia	<i>sacharovi</i> (<i>elutus</i>).

III. Africa.

NORTH AFRICA.

Algeria	<i>maculipennis</i> .
	<i>algeriensis</i> .
Tripoli	<i>algeriensis</i> .*
Egypt	<i>multicolor</i> .*
	<i>sergenti</i> .*
	<i>superpictus</i> .*
	<i>dthali</i> .*

TROPICAL AFRICA.

Throughout Tropical Africa	<i>gambiae</i> (<i>costalis</i>).
	<i>funestus</i> .
Belgian Congo	<i>marshalli</i> var. <i>moucheti</i> .
	<i>nili</i> .

IV. Asia.

Asia Minor, Transcaucasia, and Central Asia	<i>maculipennis</i> .
	<i>sacharovi</i> (<i>elutus</i>).
	<i>superpictus</i> .
Palestine	<i>sacharovi</i> (<i>elutus</i>).
	<i>sergenti</i> .
	<i>superpictus</i> .
Arabia (south)	<i>gambiae</i> .
	<i>dthali</i> .*
	<i>culicifacies</i> .*
Mesopotamia	<i>superpictus</i> (north).
	<i>stephensi</i> (south).
India and Ceylon	<i>culicifacies</i> .
	<i>stephensi</i> .
	<i>listoni</i> .
	<i>minimus</i> .
	<i>maculatus</i> .
	<i>ludlowii</i> .
	<i>philippinensis</i> .†
Siam	<i>ludlowii</i> .
	<i>maculatus</i> .*
Malaya	<i>maculatus</i> .
	<i>umbrosus</i> .
	<i>ludlowii</i> .
Cochin China	<i>maculatus</i> .*
	<i>leucosphyrus</i> .*
	<i>kochi</i> .*

* Suspected to be carriers on epidemiological grounds only.

† This species is considered by some observers to be an important carrier in Bengal and Burma.

IV. *Asia—continued.*

China	<i>hyrcanus</i> var. <i>sinensis</i> .*
	<i>pattoni</i> .*
	<i>maculatus</i> .*
	<i>minimus</i> .*
Formosa	<i>maculatus</i> .*
	<i>minimus</i> .*
Japan	<i>hyrcanus</i> var. <i>sinensis</i> .*
	<i>hyrcanus</i> var. <i>sinensis</i> .*

V. *East Indian Archipelago.*

Dutch East Indies	<i>ludlowii</i> .
	<i>maculatus</i> .
	<i>aconitus</i> .
	<i>umbrosus</i> .
	<i>hyrcanus</i> (' <i>sinensis</i> ').
	<i>leucosphyrus</i> .
	<i>kochi</i> (occasionally important).
	<i>punctulatus</i> (eastern islands).
Borneo and Labuan	<i>ludlowii</i> .
	<i>umbrosus</i> .*
	<i>leucosphyrus</i> .*
Philippine Islands	<i>minimus</i> .
	<i>ludlowii</i> .

VI. *Australasia, Melanesia and Polynesia.*

New Guinea	<i>punctulatus</i> .
New Britain	<i>punctulatus</i> .
	<i>punctulatus</i> var.
	<i>moluccensis</i> .
New Hebrides	<i>punctulatus</i> .*
North Queensland	<i>punctulatus</i> .*
	<i>annulipes</i> .*
	<i>amictus</i> .*
	<i>bancrofti</i> .*

W. F.

PELTIER. Rapport sur les questions étudiées par la Commission du Paludisme de la Société des Nations réunie à Alger les 20 et 21 mai 1930. (Extraits.) [**Questions studied by the Malaria Commission of the League of Nations assembled at Algiers, May 20 and 21, 1930.**—*Ann. de Méd. et de Pharm. Colon.* 1931. Jan.-Feb.-Mar. Vol. 29. No. 1. pp. 171-178.]

The deltas of many large rivers are almost free from malaria although anopheles are plentiful and the surrounding country is highly malarious. Professors CANTACUZÈNE and ZOTTA have studied this question in the delta of the Danube, where cattle raising is an important industry. They attribute the rarity of malaria to the zoophilism of *A. maculipennis* in this area, where it is the sole vector. In neighbouring districts, in which malaria is rife, the association of men and cattle is less close, and the anopheles are anthropophilic [see HACKETT & MISSIROLI, *ante*, p. 569].

Four years ago the Commission instituted an inquiry into the value of the various unseparated mixtures of the cinchona alkaloids,

* Suspected to be carriers on epidemiological grounds only.

or quinetum. As the result of this enquiry they consider that the value of quinetum is well proved, and they recommend its use both on account of its therapeutic value and its cheapness in comparison with quinine.

The Committee of the League organized a vast experiment in a number of hospitals, with Quinoplasmine, which is the commercial name of the newer tablets of plasmoquine compound, each of which contains 0.01 gm. of plasmoquine and 0.3 gm. of quinine sulphate. They now recommend a daily dose of 4 tablets for a period of 10 to 21 days. With this treatment, 100 per cent. of definite cures have been obtained in quartan; only 4 per cent. of relapses have occurred in benign tertian; the crescents have disappeared in 5 or 6 days in subtertian.

W. F.

SOUTHERN MEDICAL JOURNAL. 1931. May. Vol. 24. No. 5. pp. 407-463. With 8 text figs. (1 map.) [31 refs.]—**Symposium on Malaria.** [20 papers.]

The papers in this symposium were read before the National Malaria Committee at Louisville, Kentucky, in November 1930.

Dr. HACKETT contributed a most interesting paper on the Control of Malaria in Italy (see pp. 122-128, above). Associations of land-owners for financing and executing drainage schemes have existed in the Po Valley since the fourteenth century; over a hundred years ago, the grand dukes of Tuscany initiated a colossal project which will take yet another 25 years to complete. In all, the Italians have reclaimed more land from the waters than the Dutch. This land reclamation (bonification) has both hygienic and agricultural objectives. The most successful form of bonification is the filling of low land and lagoons by sedimentation. Units of 10,000 acres or more are banded to the desired level, and the rivers are turned into them at flood. When the banded area is full, the water is allowed to stand for 48 hours and is then led off over a spill-way to make room for a fresh charge. Such a process of warping, or filling on a large scale, by the sedimentation of natural waters is going on in the coastal area of Tuscany. In a good rainy season, a deposit of silt a foot deep can be obtained. The financing of bonification is made possible by the high value of well-drained agricultural land. The Government usually offers 75 per cent. of the total cost in fifty annual instalments, covered after the first decade by the taxes on increased production. The owners pay the remaining 25 per cent. The value of the land may rise from sixteen shillings to as high as £40 an acre after drainage. The soundness of these schemes depends upon the large agricultural population of the country which leads to an immediate intensive cultivation of drained areas and to a good market for produce. In countries with a sparse population, such a scheme would not be profitable. In northern Italy, where the relative absence of aestivo-autumnal malaria allows immigration and agriculture to begin at once on the newly drained land, the attention of *A. maculipennis* becomes directed to the numerous well-stabled animals, its association with man gradually ceases, and there is "anophelism without malaria." In some important cases, malaria has not been affected by drainage, the land has not been occupied and the project has been a failure; for example, the Tiber delta, though drained with pumps since 1889, remained highly malarious and 90

per cent. uncultivated for more than 30 years. Agriculture is impossible there, in the long dry season, without irrigation, and malaria was an insuperable barrier to colonization. *A. maculipennis* is a mosquito of the north temperate zone: in southern districts like the Tiber delta it seeks the coolest water, and breeds almost exclusively in the vegetation along the quiet edges of streams and drainage canals. This is why drainage, of the Panama type, though constantly attempted in Italy, has met with so little success. The failure of the delta scheme led to the adoption of State quinine in 1902. The State manufactures it, but the landowners have to pay for it and for the treatment of their labourers. Malaria is legally a notifiable, occupational disease in Italy. What has been the effect of State quinine? "We may sum up the situation very briefly by saying that the effect on severity has been marked and incontrovertible. The death-rate from malaria has rapidly descended, and cases of pernicious malaria are far less frequent now than before. The effect on incidence has been almost negligible."

Bonification is a slow process, and in recent years four other measures have been adopted: (1) *Concrete Channels*. These have been laid in the flat bottoms of the drainage canals. Such channels, which keep the water moving and are easily cleaned, with the aid of electric pumps and gambusia, have been sufficient to eliminate anopheline breeding from the area surrounding Ostia in the Tiber delta, and to abolish malaria; (2) *The introduction of Gambusia*. These little fish, introduced from the United States, multiply so astoundingly in Italy that standing waters become clogged with them to such an extent that the peasants complain that the cattle refuse to drink. In an area of about 8 square miles, in Istria, where nothing has been done but gambusia distribution, the spleen rate has gone down from 98 per cent. in 1924 to 10 per cent. in 1930, and a sanatorium which was formerly closed in the summer, because of malaria, is now kept open all the year round without a single case occurring among its 300 inmates. (3) *Larvicides*. There are many places where malaria is due to river-breeding anophelines, and here Paris green is employed. This is comparatively easy in Italy because the agricultural population lives in compact villages, and not scattered over the land. Paris greening of all unavoidable breeding places within $1\frac{1}{2}$ miles of population centres is the standard practice in Italy. The local authorities carry this out, and the landowners bear the expense. (4) *Screening*. The Government of Rome, in 1928, made it obligatory for all householders of the Campagna to screen. Perhaps the most important advance was the "Law of Mussolini," passed in 1928, under which the reclamation of all fertile but uncultivated land must be begun within ten years.

Dr. W. H. TALIAFERRO read a paper on the mechanism of acquired immunity in avian malaria. When canaries are infected with *P. cathemerium*, an acute period, with a rapid increase of parasites, is followed (if the bird does not die) by a crisis during which nearly all the parasites suddenly disappear. About a week later, the bird appears to have recovered entirely, and parasites can no longer be found, but inoculation of large quantities of its blood into healthy birds shows that there is a latent infection. This period of latent infection may last for years and, while it lasts, the bird is immune to further infection. The author found that the inoculation of blood from such immune birds did not produce immunity in normal birds. He attributes the immunity to an increase in the number of phagocytic cells, and to a greatly increased rate of phagocytosis.

Dr. Eugene WHITMORE read a paper on plasmoquine in which he deprecates its use in blackwater fever. As he points out, the drug has no action on the malignant tertian schizonts, and the destruction of the gametocytes cannot influence the course of the disease.

W. F.

UNITED FRUIT COMPANY, BOSTON, MASS. NINETEENTH ANNUAL REPORT. MEDICAL DEPARTMENT. 1930. Section II. pp. 17-60. [Papers on Malaria.]

Dr. W. E. DEEKS, in his comments on the more important diseases occurring in the tropical divisions, states that, "in carrying out a blanket treatment in a heavily-infected district, we believe that the average adult individual should receive one tablet of plasmoquine compound and ten grains of quinine sulphate twice daily for a period of six days, . . . After an interval of two weeks . . . the six day period of treatment is repeated on all of the individuals who are then found positive . . . When repeated blood surveys prove that the malaria incidence has been reduced to less than 30 per cent., efforts should be centered on the identification and treatment of all individual infected cases." [One tablet contains 0.01 gram of plasmoquine and 0.125 gram of quinine.]

There has been a progressive improvement in the Cuban Divisions. A colonization scheme has resulted in a great increase in the permanent local population, including women and children. Homes have been established, schools provided, fruit and vegetable gardens made, and labour stabilized. The camps are regularly inspected and the sick are treated. A remarkable decrease, not only of malaria, but also of other diseases has been the result.

Drs. R. B. NUTTER and J. C. MCDANIEL of Honduras conclude "that attempts at mosquito control and intensive sanitary work alone will not reduce malaria to an extent which will justify the expenditures involved to effectually control mosquito breeding in the large areas of a banana division." They pin their faith on "systematically surveying all labour camps and treating all positive cases."

Dr. J. R. MALTSBERGER of the Chiriqui Land Company, a rapidly developed division on the Pacific coast of Panama, has carried out antilarval work by filling, draining, oiling, and Paris green, in addition to treatment with plasmoquine and quinine, and he considers "that further progress undoubtedly lies in anti-larval control administered with energy and foresight." Employees who refuse treatment have their pay stopped, and other recalcitrants are fined by the local magistrates. As a result of all these measures there has been a progressive decrease in malaria.

Dr. N. P. MACPHAIL of Guatemala says that "we have learned from experience that malaria cannot be eradicated from large tracts of tropical low-lying lands . . . with anti-mosquito measures alone. The treatment of the human carrier is a most important measure."

Drs. H. C. CLARK and L. H. DUNN, of the Gorgas Memorial Hospital, Panama, report an attempt to transfer monkey malaria to man [*ante*, p. 494]. Nothing resulted from their efforts to transfer the parasites either by mosquitoes or direct blood inoculation, and they conclude that "red spider-monkey malaria and the human benign species of malaria that it so closely resembles are not identical, and that the

monkey is not, therefore, a reservoir for human malaria." Two specimens of *A. tarsimaculatus* and one of *A. albimanus*, fed on monkeys, showed positive glands on dissection.

W. F.

LANE (Clayton). **Housing and Malaria. (A Critical Summary of the Literature dealing with this Subject.)**—League of Nations. Health Organisation. C.H. Malaria/169. L.O.N.P. III. Health. 1931. III. 6. 43 pp. With 4 figs. [8 pages of refs.] Geneva. [1s. 6d. ; \$0.40.]

The following is a summary of the author's conclusions :—

"The anopheles associated by experience in the transmission of malaria are in the main house-haunters and night-biters, circumstances which make it likely that the house is important in the transmission of malaria There are 'malarious houses' where inhabitant after inhabitant acquires malaria. These houses have certain characteristics, at least in Europe; they possess dark, dirty, and often damp portions. In parts of Europe and in indigenous dwellings in the tropics, a chimneyless fire is efficient in driving away anopheles . . . this condition in the past must widely have influenced the incidence of malaria in Europe; with the invention of the chimney it needed the further institution of ample lighting before houses again became distasteful to anopheles. . . . It is the case that infected anopheles may be particularly associated with certain houses, and the question has been considered as to whether these mosquitoes have an instinct to return to a pleasant hospice after they have left it to oviposit. Such evidence as exists for an instinct of this kind is questionable; the facts are perhaps explicable as showing a tropism towards food, and, if so, they emphasize the importance of abolishing breeding-places near houses Certain species of anopheles leave the house where they have fed immediately after feeding, others remain in it for some hours. There is, however, at least in Europe, Northern America and Brazil, a condition of gonotrophic dissociation, when the need to oviposit ceases, while the need to feed does not. Mosquitoes in this condition remain in the house where they have fed, and they are capable of becoming malarious and of transmitting malaria. . . . There is no satisfactory evidence that malaria-carrying anopheles prefer the blood of animals to that of man, or that airless animal houses near human habitations necessarily protect man from the bites of anopheles. . . . In the early days of the construction of the Panama Canal, the destruction of replete anopheles in houses was held with good reason . . . to have proved a most effective anti-malarial measure; . . . The value of the screening of houses was established once and for all by the experiment designed by Sir Patrick MANSON in the Roman Campagna to test his mosquito-malaria theory in 1900. Its success showed that, if anopheles were prevented from entering houses, malaria could be avoided, . . . it is in the house that malarial infection is essentially obtained; . . . Various lines of investigation press with cumulative force the conclusion that the house is a factor of primary importance in the acquisition and spread of malaria."

W. F.

WATSON (Malcolm). **The Lesson of Mian Mir.**—*Jl. Trop. Med. & Hyg.* 1931. July 1. Vol. 34. No. 13. pp. 183-189. With 1 map. [4 refs.]

Anti-malaria operations at Mian Mir, a great military cantonment in India, were begun in 1902 by S. P. JAMES, continued in 1903 by S. R.

CHRISTOPHERS, and afterwards by other officers of the Indian Medical Service. JAMES stated in the discussion which followed a paper on "the Control of Malaria" read by Dr. L. W. HACKETT before the Royal Society of Tropical Medicine and Hygiene (*ante*, p. 124), that the operations at Mian Mir showed that mosquito reduction in that locality was difficult and expensive, and that the discovery of the mosquito cycle of the malaria parasites had not put within our grasp a simple and cheap anti-malarial weapon. Sir Malcolm Watson denies emphatically that the experiment at Mian Mir proved anything of the kind, for several reasons: (1) *The men in charge of the work were inexperienced.* "It was, for India, new work. . . . Was it likely then that from a few months' experimental work, two young men, . . . should be in a position to say, not only the first but the last word for all time—on practical anti-mosquito work?" (2) *Money was wasted on useless projects, and wrong measures were adopted.* In 1902, 74 per cent. of the money was spent in bricking and plastering a single water-course, which JAMES himself said, afterwards, was constructed on an entirely wrong plan. Money was also wasted on such futile work as bailing out pools and digging mud out of the bottom of drains. There is plenty of evidence in JAMES's report that the larval control was quite inefficient. (3) *Insufficient oil was used.* It should have been applied thoroughly once a week, but during the whole malarial season of 1902, only Rs.350 was spent on "contingent expenses for kerosine oil, materials, etc.". In the report of the operations in 1903 there is no statement of expenditure, nor is it possible to ascertain the amount spent on the work done in 1904–1909. (4) *Absence of a proper zone of protection.* In order to protect dwellings it is necessary to remove them half-a-mile from breeding places, or to surround them with an area half-a-mile broad, artificially freed from larvae, but, in the operations of 1902, every point inside the treated area was within half-a-mile of a boundary, and therefore not a single house within it was efficiently protected from malaria. In 1903, things were not much better, for the protecting zone was three-quarters of a mile wide in some places, and much less than half a mile in others.

"The anti-malarial operations at Mian Mir were in fact badly designed, and inefficiently carried out. As evidence of the cost, ease or difficulty of conducting, or the value of practical anti-malarial work either there or elsewhere, the experiments were worthless."

W. F.

LYENGAR (M. O. T.). **Absence of Malaria in the Salt-Water Lake Basin.** —*Indian Jl. Med. Res.* 1931. July. Vol. 19. No. 1. pp. 163–174. With 1 map in text & 2 plates. [8 refs.]

On the eastern side of Calcutta is an extensive, inland, saline-water basin, ten miles long and three miles broad. There are many small villages, on islands in the basin, inhabited by fishermen. For many years, the unhealthiness of Calcutta has been ascribed to the proximity of this salt-water lake; but the author's survey has shown that the basin is a healthy area almost entirely free from malaria, the gross spleen rate being only 0.3 per cent. Anopheles are very prevalent, but are almost entirely limited to the single species *A. subpictus* Grassi (*rossii* Giles), and this "seems to prove conclusively that this mosquito is a non-carrier in nature." An interesting point in connexion with

this area is the total absence of *A. ludlowi* in spite of the conditions, such as brackish water containing *Enteromorpha*, being apparently very favourable; so far as can be judged there are no essential differences between the malarious fishponds of the coastal region of the Dutch East Indies, in which *A. ludlowi* breeds profusely, and the salt-water lake basin.

W F

SWELLENGREBEL (N. H.). **Report on Investigation into Malaria in the Union of South Africa, 1930-31.**—Union of South Africa. Department of Public Health. 45 pp. 1931. Pretoria. Govt. Printer. Also published in *Jl. Med. Assoc. South Africa*. 1931. July 11 & 25. Vol. 5. Nos. 13 & 14. pp. 409-424; 443-456.

It is important to distinguish between farm-malaria and estate-malaria. In *farm-malaria* the problem wholly concerns the white population, it scares away new settlers and injures those already there; fever among the natives may be widespread, but it does not affect the labour-supply, which is indigenous and tolerant. In *estate-malaria* the fever amongst the native labour force is the main problem, in so far as it is recruited from non-malarious parts of the Union. It affects the cultivation of valuable crops and so causes serious financial losses. Malaria occurs in two distinct epidemiological types. There are *endemic areas*, in most of which little is heard of malaria though they comprise some of the worst fever areas in the Union. The reason for this is that the inhabitants have learnt to deal with malaria by quinine, screening, and the like, in such a way as to render life bearable. Then there are *epidemic areas* where malaria occurs in outbursts, with long intervals of freedom, and causes great alarm and popular outcry.

Among the 20 species of South African anopheles there are only two, *A. costalis* and *A. funestus*, which are of importance as carriers of malaria. *A. costalis* breeds in muddy puddles, provided these are exposed to sunlight, contain no vegetation at all, and are continuously refreshed by rain water. If rain stops for more than 7 days, these breeding places disappear. *A. funestus* is a stream-breeder; its larvae are found in the grassy edges of the backwaters of quickly-running hill streams and rivers. *Costalis* malaria is dependent on local rains, but *funestus* malaria is not. The occurrence of an appreciable number of *costalis* means malaria. Not so with *funestus*; in some places, there are swarms of *funestus* with no malaria, because, in these areas, they do not go into the houses; in neighbouring districts, though the numbers of *funestus* are no greater, there is a great deal of fever because the mosquitoes enter the houses to bite the inhabitants. The cause of epidemic malaria in South Africa is fairly obvious. It is mainly due to an unwonted increase of *A. costalis*, owing to an extension of its breeding area in consequence of rainy periods succeeding each other at short intervals. This allows of a fairly reliable forecast, based on the rains, or, better still, on the development of *costalis*. The alleged disappearance of malaria from an area when it is settled and planted is not due to agricultural development, which, by irrigation, provides more facilities for mosquitoes; "the instances of so-called disappearance of the fever from highly malarious areas are explained by the Europeans gradually adjusting themselves to local conditions, in a country where there occur little or no changes in the native population

and where influx of settlers is scarce." The equilibrium established is unstable, and the introduction of natives, unaccustomed to the diseases from some non-malarious area, means not only disaster for them, but also for those already settled in the district.

Most large collections of water are unimportant as breeding places; neither *costalis* nor *funestus* breed in the papyrus swamps or in the "vleis"—the swampy areas at the bottoms of valleys. "But beware of touching these swamps, as it is the easiest thing in the world to render them dangerous The surest way to render even a large swamp dangerous is to drain it, and not to take care that the drainage furrows are either full or empty. Puddles . . . are almost sure to breed *costalis*." Touching the question of "clearing," or cutting down vegetation as an anti-malaria measure, because it harbours mosquitoes, there is not sufficient evidence that it does so, and the only places where we find many anopheles taking shelter are houses and clefts between moist rocks. In dry years, pools form in the beds of rivers and *costalis* breeds in them. In a rainy year, all these breeding places are washed away, but they reappear in the middle veld, farther from the rivers, as rain water puddles. In the low flat country, one is in an area of almost pure *costalis* malaria; in the foothills with their numerous streams is the region of *funestus* malaria; above 3,000 feet *funestus* disappears because it is too cold. The lower temperature does not affect *costalis*, and altitude to get away from malaria is not to be relied upon if *costalis* can establish itself: it is the absence of suitable puddles in the hills which prevents its breeding. "The source of infection for anopheles in an endemic area is the native population, and the place of infection the native hut There are conditions rendering the prevention of malaria in the Transvaal an easier problem than in any other country I know of, and others which make it the most difficult I have ever seen. The former relate to the insect vector, the latter to the human carrier." The stream-breeder, *funestus*, is not very difficult to deal with, and *costalis*, by its almost complete dependence on local rains, is an ideal subject for malaria prevention by anti-larval control. The great difficulty is the population; the white settlers are scattered all over the country, living on isolated farms, far from medical assistance. Malaria in the native location is not a danger to the white man.

Prophylactic quininization "is the most hope-inspiring anti-malarial measure" in the Transvaal. The spleen rate of 39 children belonging to non-quinine-taking families was 77; the spleen rate of 52 children belonging to quinine-taking families was 52. In some areas, screening is widely practised, and though, as a rule, far from perfect, the screened houses contained only a tenth of the anophelines found in the unscreened, and the spleen-rate of the children was 50 per cent. less. In epidemic areas the inhabitants take few precautions, because the discontinuity of the disease gives insufficient incitement to the people to exert themselves. A great deal may be accomplished by the district surgeons seeking contact with the people and visiting them in their homes, not only instructing them how to treat themselves with quinine, and how to deal with anopheles breeding places near their farms, but also teaching them the importance of screening and of killing mosquitoes inside their houses. In many districts the diet is deficient in green vegetables and fruit; here, again, the district surgeon's advice is necessary. He should receive the help of district nurses of the health visitor type. "Additional training of the district surgeon and his influence being multiplied by district nurses is one of the most promising anti-malarial

measures in the Transvaal." Free quinine should be supplied only to those genuinely unable to pay for it ; otherwise the public loses a sense of its value even to the extent of buying patent so-called remedies instead of using it.

An experiment in control should be undertaken in an endemic area where there is much malaria. Each farmer will have to do, or at least supervise, the work himself. The farmers have such wrong notions about dangerous breeding places that they need the most detailed advice, and this should be given by a specially trained sanitary inspector. They should be taught how to oil, or Paris-green, all collections of water, indicated on a sketch-map of their farm, once a week for the 4 months January to April. It is improbable that farmers in epidemic areas would adopt this scheme, but as the *costalis* breeding places (the only ones of importance in these areas) are limited to the rivers in non-epidemic years, the farmers should be advised to live at least half a mile from their banks. If the authorities wish to establish settlements of poor whites in highly malarious areas, the houses should be united into one closely-built village, on a site outside a *funestus* area. All the houses must be screened and there must be a sanitary inspector for each village, but the anti-larval work must be done by the villagers themselves. " No amount of endemic malaria need prevent European settlement, provided the necessary personal precautions are taken, viz., prophylactic quinine, screening, regular killing of mosquitoes inside the house, and segregation of natives."

Malaria on the estates in the sugar-belt of Natal is almost entirely due to *costalis*. All breeding places around the complex of European establishment and native compound (which should be close together for the purpose of supervision) should be dealt with by filling with sand or oiling. It is a very simple matter. Attention must be paid to the general principles of estate sanitation, and the Government should institute labour inspection to see that the necessary measures are carried out. All cases of illness lasting more than three days should be treated in hospital, so that accurate knowledge may be obtained of the diseases occurring on the estates, and proper records may be kept. The importation of natives from non-malarious areas into the sugar-belt is sometimes responsible for outbreaks. This danger can be avoided by employing labour recruited from intensely malarious districts where there is a high degree of tolerance. This tolerance is not immutable ; bad food and bad sanitation can destroy it. Children from an area like this are dangerous to their surroundings, but the adults are not. Such malaria-tolerant labour should be employed on railway construction in fever areas, but not in regions free from malaria.

As regards the treatment of malaria among the native population : in highly endemic areas there is great tolerance of malaria, even the heavily infected children suffer comparatively little, and the mortality among them is low ; the adults are healthy, suffer only occasionally from fever, and a very small dose of quinine will set them right again. These people are not eager or thankful for quinine, and they are better without it, because the process of immunization among them would be hindered by quininization. Further research is necessary in these endemic areas. In epidemic areas the natives are anxious to take quinine during an epidemic and the Natal system of native malaria assistants, who initiate treatment in the reserves during epidemics, should be continued.

As regards research and instruction, what is required is intensive

research continued for a long time at a field station for malaria control, established in a highly malarious district, so that the influence of seasonal changes may be estimated and entomological and epidemiological findings may be closely co-ordinated.

W. F.

SYMES (C. B.). **Report on Anophelines and Malaria in the Trans-Nzoia District.**—*Kenya & East African Med. Jl.* 1931. June & July. Vol. 8. Nos. 3 & 4. pp. 64-77, 108-121. With 3 charts. [4 refs.]

Kitale, the centre of the district which lies north of the Nzoia River, is situated 1° north of the equator, but as the altitude varies from 5,000 to over 8,000 feet, the temperature is pleasant and the district is one of the best settled in Kenya. There are many streams and the rainfall is about 45 inches. Until settlement was begun in 1919, the area was practically unoccupied owing to the warlike activities of the Masai. Larvae of the following anophelines, in order of numerical prevalence, were found during the present survey: *A. natalensis*; *christyi*; *mauritanus*; *costalis*; *funestus*; *squamosus*; *implexus*; *transvaalensis*; *nili*; *cinereus*; *pretoriensis*; *marshalli*; *maculipalpis*; *rhodesiensis*; *pharoensis*. Those most obviously associated with malaria were *A. costalis* and *A. funestus*; other species were too rarely found in houses to be of importance. Precipitin tests carried out on the stomach contents of captured adults, demonstrated the preference of these mosquitoes for human blood; out of 167 *A. costalis*, 137 contained human blood; out of 812 *A. funestus*, 499 contained human blood. In most of the huts, the mosquitoes have an equal opportunity of feeding on livestock. Sporozoites were found in 7 out of 90 *A. costalis*, and in 1 out of 15 *A. funestus*. The importance of distance from a breeding place is not the same on all farms; "on one farm it may be easier for adults to fly a distance of 600 yards than 100 yards on another because of the local vegetation and topography." The author believes that fewer Europeans would be infected if all the African staff were housed in one spot so that anopheles in only one area became infected; at present, native huts are scattered broadcast, and the unfortunate settler is surrounded by a ring of infection. Blackwater fever is most common about 2 months after the peak of subtertian malaria, when *P. malariae* is the most prevalent parasite; on these grounds the author suggests that "blackwater may be a manifestation of a superinfection of subtertian on quartan malaria (or vice versa) carried by *A. costalis* and *A. funestus* respectively."

W. F.

SERGEANT (Edm.), SERGEANT (Et.), PARROT (L.), FOLEY (H.), CATANEI (A.) & SENEVET (G.). *Etudes épidémiologiques et prophylactiques du paludisme, 26^e, 27^e et 28^e campagnes en Algérie en 1927, 1928 et 1929.* [**Antimalarial Campaigns in Algeria, 1927-1929.**]—*Ann. Inst. Pasteur.* 1931. Apr. Vol. 46. No. 4. pp. 457-466.

The year 1927 saw the end of the steady decline of malaria in North Africa, and in 1928 it flared up after heavy rain. The amount of malaria in each of these years was predicted from the rainfall in the spring. In 1927, following a dry spring, there was little malaria, except

in a few spots where it had been wet ; in 1928, after a wet spring, there was a great deal. In places where prophylactic precautions were taken, there was less malaria than elsewhere. Energetic combined operations were undertaken in 1928, by the anti-malaria service, the district medical officers, the district engineers, and the school teachers. Quinine, 6 grains in a capsule daily for adults, and a smaller dose for children in a chocolate pill, was widely distributed ; anti-larval measures were undertaken, and the people were instructed by films and lectures. As a result there was less malaria in 1929 than was predicted on meteorological grounds, except in the untreated areas where the disease continued unabated. Since 1902, certain test areas have been selected in the most highly malarious parts of Algeria, and practically every known anti-malaria measure has been tested in these places. The experiments have shown that it is possible to reduce the splenic and parasitic indices to negligible proportions. The authors conclude that modern methods are efficacious, and accelerate the improvement which occurs much more slowly under natural development. The expense, however, is great, and the extent of success is limited by the money at command.

W. F.

FEDERATED MALAY STATES. **Annual Report of the Malaria Advisory Board for the Year 1930** [WILSON (Christopher J.), Chairman].—22 pp. With 4 folding sketch diagrams. 1931. Kuala Lumpur : Govt. Press.

The Chief Health Officer reported that there had been a slight increase in the number of deaths from all causes, as compared with the previous year, and that this increase was largely the result of malarial conditions. Special reference was made to outbreaks in certain places such as Port Swettenham, notorious in the past. An interesting item in the Report is a reference to drought as a cause of malaria : in one district "an epidemic of malaria . . . had been provoked by cessation of oiling, which had resulted from the fact that every drop of water was required for drinking and washing purposes."

W. F.

STEWART (A. D.). **Notes on a Visit to the Malay Peninsula.**—*Indian Med. Gaz.* 1931. Aug. Vol. 66. No. 8. pp. 457-465. With 3 text figs.

"Malaria is now a serious factor on many estates, and would still be everywhere were the conditions preventing it relaxed for even a year or two. It is a universal topic on every estate and dominates every other medical consideration." The earlier method of subsoil drainage has been modified by Dr. HUNTER of Singapore, with much success. His method is briefly as follows : The ravine is first cleared of trees and shrubs ; then three, deep, open drains are dug, one central and two lateral contour drains. These are left as earth drains for six months, and oiled if necessary. This lowers the subsoil water, and shows how deep it will be necessary to make the permanent central drain. This is then graded for treatment, commencing from below upwards. Dr. HUNTER prefers an open central drain, with concrete inverts, having

projecting studs to keep a space between the joints, in order to admit seepage water. The sides of the drain are grassed down to the invert or, better, are revetted with flat earthenware slabs. It is seldom necessary to pipe the whole of the contour drains; in most of their length they are simply filled with stones. At points where seepage has been noted, a short length of subsoil drain is put in, with a branch running down to the central drain, in which no gradient above 1 in 30 is permitted. The author concludes that "the methods used in Malaya are narrowed in their scope by the limited number of carrier species that have to be dealt with. These methods even apart from the cost question would have a limited field of application in India."

W. F.

NIEUWENHUIS (A. W.). Die Entstehung der Polynesier und ihrer Kultur. Der Einfluss endemischer Malaria in Ozeanien. [**Influence of Endemic Malaria in Oceania.**]—*Acta Leidensia (Scholae Med. Tropicae)*. 1930. Vol. 5. pp. 128-192.

In this lengthy monograph on the culture of the Polynesians the author quotes extensively from Professor Macmillan BROWN'S book, "The Riddle of the Pacific," published in 1924. A quotation states that, "No masterful or imperial race ever came out of the tropics or ever will come out of them. Even in the warmer parts of the temperate zone the rulers of empires generally come from the colder north." Again, "The imperial ambitions that produced a Kamehameha and a Pomare in an environment that was marked by licentiousness and decay must have had its origin and heredity in some climate different from that of the tropics." The author is not inclined to accept these views. He contrasts the populations in malarial and non-malarial districts. He concludes that not only the physical qualities, but also the mental are much higher in populations living in non-malarial districts than in those living in endemic areas. In support of his conclusion that endemic malaria has played an important part in the deterioration of the culture of the people of Oceania he quotes the opinions expressed in the work by JONES, ROSS and ELLETT, "Malaria a neglected Factor in the History of Greece and Rome."

E. D. W. Greig.

RICE (E. Milford). **On the Economic Aspect of Malaria to Tea Estates in the Bengal-Dooars.**—*Jl. Trop. Med. & Hyg.* 1931. July 15. Vol. 34. No. 14. pp. 193-204. With 3 graphs in text.

The author estimates that on an estate of 1,600 acres, worth £140,800, malaria causes a loss of £4,555 a year, or more than 3 per cent. on the capital. This is on the basis that a cooly is worth £30 to the estate. He concludes that it would be justifiable to spend £900 per annum to reduce the incidence of malaria by 50 per cent. "Nothing is more evident than that at the present time very large amounts of money are being frittered away by estates in the Dooars for useless anti-malarial work, which may, in fact, be causing a very great increase in the infection rate," by cutting the jungle over streams and making them suitable breeding places for *A. maculatus* and *A. minimus*.

W. F.

MACDONALD (G.) & CHOWDHURY (K. L.). **Report on a Malaria Survey of the Tea Gardens in the Mariani Medical Association, Assam.**—*Records of the Malaria Survey of India*. 1931. Mar. Vol. 2. No. 1. pp. 111–156. [5 refs.]

This paper deals with malaria on eighteen estates controlled by seven tea companies which are grouped together for medical purposes under the Mariani Medical Association. The gardens lie near the foot of the Naga Hills. The dangerous carriers are *A. minimus* and *A. culicifacies*. The chief recommendations made by the authors as the result of their survey are that greater care should be taken in the selection of sites for cooly lines, and that the principal method of attack should be by making the water unsuitable for breeding by the growth of vegetation; where this has failed, or has not been done, Paris green should be used as a temporary measure. Paris green should also be used on swamps and pools where *A. culicifacies* breeds.

W. F.

MANSSELL (R. A.). **A Discussion on Malaria in the Quetta-Pishin District.**—*Jl. Roy. Army Med. Corps*. 1931. June. Vol. 56. No. 6. pp. 401–409. With 5 charts & 1 sketch map.

Quetta is about 5,500 feet above sea level. The district consists of precipitous, barren, mountain ranges, enclosing alluvial valleys. The soil is light and porous; natural vegetation, except in the immediate vicinity of the few permanent waters, does not occur. The winter rains and snow provide water for the crops, but during the greater part of the year it is a sandy, dust-coloured country, burnt dry by the sun and blown bare by the wind. Water supplied for irrigation disappears into the ground with such amazing rapidity that cement water channels are only a handicap to the malaria worker. In Quetta cantonment the breeding places of mosquitoes are the bricked siphons carrying water under the roads, a few places near the main irrigation channel, and running taps in gardens. The features of the climate are high diurnal and annual variations of temperature, low rainfall, and low humidity. Malaria is endemic on the plateau, and occasionally becomes epidemic. There is not often much mosquito breeding in Quetta itself, but in the surrounding country, wherever there is a constant flow of water with marginal vegetation, mosquitoes breed freely from the middle of May to the middle of September. Many species of anopheles occur among which are *A. culicifacies*, *A. listoni*, *A. stephensi*, and *A. superpictus*. The author discusses the possibility of *A. stephensi* breeding in the "karez." The karez is started from a point in a valley where water outcrops; and, from this point an ever-deepening channel is dug backwards towards the source of water in the hills. When the channel becomes too deep it is converted into a tunnel following the direction of the waterflow. At intervals, shafts are sunk down to the tunnel, which is only large enough to permit the passage of one man and may be many miles in length. The shafts in Quetta, of a karez which runs through the cantonment, are nearly 80 feet deep. The karezes are constructed with the most primitive implements by people who follow this work as a hereditary occupation, and they form the main sources of water for large tracts of country.

W. F.
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WILKINSON (Sydney Arthur) & STUBBS (W. D.), assisted by Vaikunthrai Manilal DESAI & Kunwar BEHARILAL. **A Malaria Survey of Ajmer City 1930.**—pp. viii+30. With 5 text figs., 1 folding map, 1 folding chart & 1 folding plan. 1931. Bombay: The Times of India Press.

Ajmer, the second city of Rajputana, lies on a plateau 1,500 feet above sea-level, and is surrounded by hills. It has a population of 113,000, about half of whom are employed on the Bengal, Baroda, and Central Indian Railway. The spleen index shows that it is an area of moderate endemicity, but outbreaks of malaria occur after heavy rain. This survey was made by the authors in their spare time. They found that the important anopheles was *A. stephensi*, and that its breeding places were the waste water from the public stand pipes, garden sumps, tubs, pots and pans, and also the pools left near the edges of a couple of artificial lakes when these were drying in the hot weather. They concluded that the malaria of Ajmer was man-made and easily preventable. The application of municipal regulations already in existence would reduce malaria considerably, and if even the small amount at present spent on anti-malarial work by different bodies were scientifically utilized there would be a rapid decrease of the disease.

W. F.

SUN (T. C. Y.) & YOUNG (M. P.). **A Report on 167 Cases of Malaria treated in Elizabeth Blake Hospital during 1930.**—*China Med. Jl.* 1931. Mar. Vol. 45. No. 3. pp. 258-265. With 2 diagrams & 2 charts.

The results of examining the blood of out-patients and in-patients showed that statistics based on the examination of a hospital population are not always a true index of the relative prevalence of the three different kinds of malaria. The figures for in-patients were 70 per cent. subtertian; 24 per cent. benign tertian; 4 per cent. mixed; and only 2 per cent. quartan. Among the out-patients no less than 32 per cent. were quartan cases, the explanation being that the milder cases do not go into hospital.

W. F.

Yoré (Hillel). Le paludisme en Palestine. [**Malaria in Palestine.**]—*Rev. Prat. Malad. des Pays Chauds.* 1930. Dec. Year 9. Vol. 10. No. 12. pp. 552-563. [15 refs.]

Palestine is well suited for major drainage operations because it runs down in steep slopes to the sea on one side, and, on the other, to the valley of the Jordan which ends in the Dead Sea, 400 metres below sea level. The most important anopheles are *A. clutus*, which breeds in stagnant pools full of weeds, and *A. sergenti* which breeds in slowly running water. Much has been accomplished by improved cultivation and organized colonization; in this respect the author pays tribute to Baron Edmond de Rothschild, who inaugurated the scheme of Jewish colonization in 1888. Drainage, intensive agriculture, and anti-larval measures, have been almost everywhere successful. For example, Petah-Tikvah, in Judea, was formerly a poverty-stricken village surrounded by a collection of Bedouin tents; since a Jewish colony

was founded there it has become the centre of the orange plantations, with a population of about ten thousand, and malaria, which was once prevalent, now occurs only sporadically. In Jerusalem itself, where storage tanks are one of the principal causes of malaria, the government is introducing a water supply. The author advocates the free distribution of quinine in all places where more radical measures of malaria prevention cannot be undertaken or have not been completed.

W. F.

WOLSKI (M.). Zur Klinik und Epidemiologie der Malaria nach den Angaben der Malariainstitutionen der Stadt Samara. (Mitgeteilt auf dem 3. Wolgakongress für Malaria in Samara.) [**Symptomatology and Epidemiology of Malaria as met with in the Malarial Institutions of Samara.**—*Arch. f. Schiffs- u. Trop.-Hyg.* 1931. Aug. Vol. 35. No. 8. pp. 471-482. [18 refs.] [Malaria Station, Samara-Satoust Rly., Samara.]

In this investigation the results are recorded of a study of 16,765 malarial cases during the years 1923, 1924, and 1925. The great majority of malarial infections were benign and malignant tertian. In 1923 the predominating form was benign tertian; quartan was only observed in the early stages. In 1925 there was an increase of malignant tertian. The number of mixed infections increased with each year. There appears to be a territorial distribution of the forms of malaria, but no connexion between age periods and the different forms. The spleen and Ross index are highest in quartan and mixed infections. These indices reach their maxima during childhood and gradually diminish as age advances. The spleen index diminishes as the city is approached, the lowest being in the city itself. The liver was found enlarged in the majority, most frequently in quartan infection, less frequently in benign tertian and least in malignant tertian. There is a close association between liver and spleen enlargement. Each form of malaria has a distinct curve of fresh infections with a peak at a definite period of the year.

E. D. W. Greig.

RYBINSKY (S. B.). **Further Observations on the Malarial Curve in Kiev.**—*Zent. f. Bakt. I. Abt. Orig.* 1931. Aug. 11. Vol. 121. No. 7/8. pp. 409-413. With 2 text figs. [14 refs.] [Bact. Inst., Kiev, Ukraine.]

Malaria was imported into Kiev in 1920 by famished refugees from the valley of the Volga where the disease was malignant. At first, the malaria curve showed two peaks, one in spring and one in autumn, but, under the influence of the cold summers of Kiev and the improved conditions of the people, the malarial plasmodium began to lose its virulence; the autumn rise slowly disappeared, the disease became less prevalent and, at the same time, it assumed a milder form. The spring rise, which is due to the occurrence of cases with long latent periods, infected in the autumn, is a manifestation of a weakening of the malarial virus under the influence of a cold climate. The treatment in the spring, before the mosquito season, of persons previously ill with malaria has been successful in reducing the disease.

W F.

JANCSÓ (Nicolas) & D'ENGEL (Rodolphe). Observations sur les révi-vi-scences du paludisme aux environs de la ville de Kolozsvár, pendant une période de cinquante ans. [**Fifty Years' Observations on Recrudescent Malaria in the Neighbourhood of Kolozsvár.**—*Riv. di Malariologia*. 1930. Nov.-Dec. Vol. 9. No. 6. pp. 725-733. With 1 text fig. [Internal Clinic, Univ., Szeged, Hungary.]

These epidemiological observations were made at the François-Joseph University during the period 1873 to 1919, and concern a circumscribed area in the west of the Transylvanian basin. This area includes the town of Kolozsvár, with 60,000 inhabitants, and 116 villages with a population of 120,000. During the 50 years of observation, there have been three waves of malaria: the first appeared in 1870 and reached its crest in 1877; the second appeared in 1890 and culminated in 1897; the third wave did not appear until 1916. During the intervals between these waves of endemic malaria, cases of the disease are very rare. Why is this? No drainage, regulation of water-courses or bonification has been carried out. There is no evidence that meteorological conditions play any part in it. Anopheles (*maculatus* and *bifurcatus*) are as numerous and as easily infected in the malaria-free years as in those when the disease is prevalent. Experiment has shown that the fall of the wave is not due to an immunity which it has provoked in the population; moreover, the proportion of the inhabitants which becomes infected is too small to make this a factor. No quinine prophylaxis or screening is carried out. The author concludes that malaria occurs in wave-like oscillations, like the waves of pandemic influenza, uninfluenced by external conditions and due to unknown causes.*

W. F.

BARBIERI (Antonio). El paludismo y los factores meteorológicos y heliofísicos en la República Argentina. Su epidemiología. [**Epidemiology of Malaria and Meteorological Factors in the Argentine.**—*Prensa Méd. Argentina*. 1931. Apr. 30. Vol. 17. No. 33. pp. 1616-1628. With 4 graphs. [23 refs.]

The author discourses on certain meteorological factors in the Argentine and on the prevalence of malaria in various districts and from a correlation of these is of the opinion that future epidemics are predictable. The chief endemic zones are the Provinces of Jujuy, Salta, Tucuman, Catamarca, La Rioja and Santiago del Estero, where there are well watered, shaded valleys, exuberant vegetation, a mean annual temperature of 20-21° C. and abundant rain. The important vectors of malaria are *A. pseudopunctipennis*, and to a less degree *A. argyrotarsis* and *A. albimanus*.

During the last 50 years, those of large epidemics have been 1878, 1889, 1901-2, 1913-14, 1919, 1924, 1930-31, that is "a typical cycle" of 11-12 years, and "less typical" of 5-6 years. In Paraná and Uruguay, the cycles were closely similar, 1858, 1868, 1878-79, 1888-89, 1901, 1912, 1924, 1929, and 1931.

* CELLI pointed out that since the middle of last century severe malarial epidemics had occurred in the Roman Campagna with approximately 10-yearly frequency. Mild outbreaks alternated with the severe epidemics [see this *Bulletin*, Vol. 24, pp. 411 et seq.].

In a graph are shown the correlations between temperature, barometric pressure and solar radiation and the author notes that at intervals of 11.1 years there has been exceptionally heavy rainfall, reduction of solar radiation, absence of sun-spots, and that this period coincides with the revolutions of Jupiter (11.86 terrestrial years), and he concludes that taking into account the atypical cycles of approximately five years he can predict epidemic exacerbations of malaria in subtropical South America, between 20° and 40° south latitude every 5-6 years starting from 1930.

H. H. S.

GERBER (C. W.). **Summary of Malaria Control Work in Dona Ana County, New Mexico.**—*Southwestern Med.* 1931. Aug. Vol. 15. No. 8. pp. 370-375.

For 30 years or more, malaria was unknown in the county, but in 1915 large irrigation works were commenced and, in 1918, it became necessary to construct drainage canals, because the land was becoming water-logged. The drainage canals have been continually extended and they have been allowed to become choked with weeds. The population has increased by 63 per cent. since 1923, and, owing to the fluctuating demand for cotton-field workers, people are continually coming and going. With these changing conditions, malaria appeared in 1925, and has become a serious problem. *A. pseudopunctipennis* breeds in the sunlight, in the centre of the drainage canals, and *A. maculipennis* breeds near the shaded edges. "The use of a combination of methods such as dust diluted Paris green, oil mixtures, oil and Paris green mixtures, Paris green and wet sand, the propagation and distribution of top minnows, the instruction of the inhabitants . . . adequate treatment . . . has resulted to a comparatively high degree in reducing the Anopheles mosquito production, the number of local transmissions, and the total number of cases of malaria."

W. F.

FERRELL (John A.). **Challenge of Malaria in the South.**—*Amer. Jl. Public Health.* 1931. Apr. Vol. 21. No. 4. pp. 355-374. With 8 text figs. [1 ref.] [Internat. Health Division, Rockefeller Foundation, New York.]

The first table in the paper gives the death rates from malaria for the Registration Area of the United States from 1910 to 1929 and for the 9 southern states of the Union for 1918-29. The author points out that the figures for the Registration Area are not comparable throughout the period as only 9 out of the 16 states classed as malarious were included within the area and in 1910 only California. Table 1A gives details of certain states, the death rates of which during 1919-21 exceeded 1 per 10,000. Table II gives the deaths and population of Virginia and of 10 south-western counties of Virginia. For the state as a whole the deaths recorded vary from 81 in 1918 to 13 in 1928. Table III records deaths and populations for Kentucky, Tennessee, Mississippi, Virginia, North Carolina and South Carolina for the years 1918-29. Each seems

to show a declining rate from 1921 to 1927, and some a tendency to increase in the following two years. Table IV gives details for subdivisions of North Carolina. Table V records the experiences, 1918-29, (for two States, 1915-29) of Arkansas, Texas, Missouri, Alabama, Florida, Louisiana, Georgia. Table VA gives details for the counties of Florida, Alabama and Georgia. The trends seem similar to those noted for the states included in Table III. Tables VI and VII give the death rates, for whites and negroes separately, from malaria for subdivisions of Mississippi, 1914-28. Table VIII records the death rates (1919-29 in three cities, 1925-29 in the fourth) of four southern cities. The author thinks that the factors making for the general recession of malaria have not yet been convincingly evaluated. The increase of mortality from malaria in Florida and Alabama in 1929 to a value higher than recorded in 1921-22 and the smaller increases in other affected states make it "clear that malaria is still a menace to the health and working efficiency of the people of the South and that the measures directed against it were inadequate for holding the gains through wet years."

M. Greenwood.

KORTEWEG (P. C.). **What is the Normal Type of Fever in Primary Cases of Benign Tertian Malaria? Is it Tertian or Quotidian?**—*Jl. Trop. Med. & Hyg.* 1931. Aug. 1. Vol. 34. No. 15. p. 251.

The author found that the normal type of fever was tertian [see also p. 591, *ante*], whereas S. P. JAMES on the contrary noted that it was quotidian and suggested "a possible explanation of the different results observed in the two countries may be that unavoidably Dr. Korteweg's work was done upon patients some of whom had previously suffered from an unrecognized malaria attack." Dr. Korteweg holds that the differences between the types of fever observed in England and Holland must be due to some other cause; his mental patients came from all parts of the Netherlands, where, with the exception of a few small foci, malaria is endemic in only one of the eleven provinces.

W. F.

ALESSANDRINI (Mario). Sulla trasmissibilità del *Plasmodium falciparum* dalla madre al feto. (**On the Transmissibility of "Plasmodium falciparum" from Mother to Infant.**)—*Riv. di Malariaologia.* 1931. Mar.-Apr. Vol. 10. No. 2. pp. 197-201. With 3 figs. on 1 plate. [8 refs.] English summary (4 lines) pp. 266-267.

The natural placental filter usually prevents the passage of malarial parasites when present in the mother's blood from passing to the foetus, but small infarcts, capillary lesions and such like may result in the obstacle being overcome. In the author's opinion the parasites are only present in the foetal blood (umbilical cord) when they are very numerous in the placenta, and even then are exceedingly scarce in the former. When practising in Lecce, a locality in which the population is "nearly 100 per cent. malarious," the author took the opportunity

of examining the peripheral blood of mothers in parturition, of the placenta, and of the umbilical cord. He gives brief notes of 10 patients, all malarious; in two there were parasites at the time in the peripheral blood, but in nine there were none in the placenta or cord. The tenth was a woman suffering from bilious remittent fever; her blood showed *P. falciparum*, the placental blood was heavily invaded, 90 per cent. of the red cells being parasitized, the umbilical blood showed the parasite in the same stage as those in the mother, but exceedingly few, only 12 or so, were found in a search of several hours. He did not find any nucleated red cells invaded. [The "leucocytic formula" of the foetal blood is given as megaloblasts 10, erythroblasts 38, polymorphonuclears 34, lymphocytes 16, large mononuclears and transitionals 2 per cent. !]

H. H. S.

- i. CHANTRIOT. Syphilis, paludisme et sérologie. [**Syphilis, Malaria and Serology.**]—*Rev. Prat. Malad. des Pays Chauds.* 1931. June. Year 10. Vol. 11. No. 6. pp. 249-56, 259-61. [16 refs.]
- ii. TRABAUD (J.). Les réveils accidentels de l'infection palustre. [**Incidents which arouse Latent Malaria.**]—*Ibid.* pp. 262-4, 267-8.
- iii. HAKIM (Assad). Quelques formes nerveuses et mentales de l'infection palustre. [**Some Nervous and Mental Diseases due to Malaria.**]—*Ibid.* pp. 269-272.

i. Captain Chantriot has found that an attack of malaria has the same beneficial effect upon visceral or latent syphilis as it has upon syphilis of the nervous system. He has seen many cases which had previously resisted specific treatment, respond to it at once after an attack of malaria, and many in which an obstinately positive Wassermann reaction has become negative. Shock produced in other ways, for example by the inoculation of foreign proteins such as a vaccine or horse serum, or by auto-haemotherapy, can act in the same way.

ii. Professor Trébaud contributes a useful paper on the accidents which may awaken a latent malaria; infectious diseases such as influenza and typhoid; therapeutic inoculations, such as injections of arsenobenzol and colloidal salts; protein shock, after vaccine or serum treatment; exposure to heat and cold; poisons and trauma, such as alcoholism, fractures and childbirth.

iii. Dr. Hakim gives an account of three cases seen in the Asylum of Avicenne at Damascus. One with bilateral paralysis of the circumflex nerves; one with mental confusion and somnambulism; one with Parkinsonian symptoms. In each case he considers that malaria was the cause.

W. F.

BONNIN (Henri). L'avenir des paludéens rapatriés en pays non impaludé. Le paludisme de guerre en 1931. [**The Prospects of Malaria Patients on Return to a Malaria-free Country. War Malaria in 1931.**]—*Gaz. hebdomad. Sci. Méd. de Bordeaux.* 1931. Apr. 19. Vol. 52. No. 16. pp. 245-253. [10 refs.]

There are two groups of malaria patients in France: those who became infected in Macedonia during the war, and those who have

contracted their infections in the French colonies. The course of the disease appears to be quite different in these two groups. Malaria in the old colonial disappears in a year or two after his return to France, but this is not the case with the war veteran in whom the disease still appears to flourish. At a congress of old soldiers held at Caen in 1930, it was agreed that all who had been infected with malaria during the war ought to receive a pension of 10 per cent. Subtertian infections generally disappear within a year of return to a non-infected country, and benign tertian within two or three; quartan sometimes lasts longer, but there was hardly any quartan malaria in Macedonia. Cases of long latent infection have been recorded: RUGE, 9, 10, 13 years; SCHILLING, 8 years; PLEHN, 6 and 13 years; BLANCHARD, 6 years; NOCHT, 8 years; but these are all exceptional cases and were recorded as such. The law, the Press and many doctors, believe in these long-lasting war-infections as much as the patients do themselves. Every kind of illness and accident which happens to an old soldier who was infected during the war is put down to malaria: diabetes, aortic disease, hemiplegia and epilepsy are all attributed to malaria. The author has recently seen a man given 60 per cent. retired pay for a polyneuritis supposed to be due to malaria contracted more than ten years ago in the war, although there were no signs or symptoms of the disease. He has examined numbers of these war cases and has found neither the malaria parasites nor the enlarged spleen which would be present if they were really suffering from the disease.

W. F.

VIALATTE (Ch.) & SAINTE-MARIE (P. E. Flye). Autour du "mystère" de la fièvre quarte (remarques épidémiologiques). [**The Mystery of Quartan Fever.**—*Bull. Soc. Path. Exot.* 1931. Apr. 15. Vol. 24. No. 4. pp. 280-282. [2 refs.]

Quartan malaria constituted 6.5 per cent. of all cases of malaria admitted to the Cocard native hospital, in Morocco, during the three years 1928-30. The percentage of quartan among the troops during the same period was only 0.34 per cent. The authors attribute the different incidence in the two groups to the prophylactic quinine taken by the soldiers. [They say that quinine acts more rapidly and completely upon the parasites of quartan than upon the other forms. This is contrary to the experience of many observers; the relative prevalence of quartan in the natives may be due to its chronicity.]

W. F.

TOPORKOW (F. M.). [**Epidemiology of Quartan Malaria.**—*Trop. Med. & Vet.* Moscow. 1930. Vol. 8. No. 8/9. pp. 4-7. [In Russian.]

The author has studied the statistical material on the incidence of quartan malaria in Russia, and arrives at the following conclusions: The prevalent idea that quartan malaria occurs only in certain foci is based on isolated examinations. The examination of the records for five successive years shows that this type of malaria is distributed in all malarious localities. There appears to be a certain periodicity in its occurrence; in the majority of localities quartan malaria is prevalent during the autumn and winter months.

C. A. Hoare.

MACDONALD (G.). **The Mechanism of Infection with Malaria in Children living under Endemic and Hyperendemic Conditions.**—*Indian Jl. Med. Res.* 1931. Apr. Vol. 18. No. 4. pp. 1347–1372. With 7 graphs. [10 refs.]

This paper is based on the results of nine series of blood and spleen examinations made during a survey in Assam (see Macdonald and CHOWDHURY above, p. 987) and on work done in Sierra Leone. Repeated examinations over a period of 6 days showed that only about 60 per cent. of infections are discovered by the examination of a single thick film. In endemic areas such as Assam, it may be assumed that all children with enlarged spleens are infected, yet the parasite rate among these enlarged spleen cases is only 55 per cent. ; therefore 45 per cent. of the infections are missed. To obtain an idea of the true infection rate in such a district the general parasite rate should be multiplied by a factor based on this error. This true infection rate and the spleen rate show a relationship to each other which cannot be explained except on the ground that only some 50 per cent. of infections produce enlarged spleens. Analysis of the Assam figures showed that (1) The parasite rate reaches its height in the first two years of life, except in the less malarious lines. (2) The numerical frequency of parasites in the blood decreases rapidly after the first two years. (3) The spleen rate reaches a maximum in children aged 3 to 6, and thereafter declines. (4) A relative immunity to malaria is gradually acquired by the children.

W. F.

GARNHAM (P. C. C.). **Observations on *Plasmodium falciparum* with Special Reference to the Production of Crescents.**—*Kenya & East African Med. Jl.* 1931. Apr. Vol. 8. No. 1. pp. 2–21. With 2 charts & 3 plates. [23 refs.]

This paper describes observations on some 200 cases of malaria in the native hospital at Nairobi. Warrington YORKE found that spleen puncture films differed little from peripheral blood films made at the same time (*ante*, p. 1). The author ascribes this to the examination of splenic blood drawn off with a syringe. He obtained spleen pulp by inserting a wide bore needle into the spleen between the lower ribs, closing the butt with the finger before withdrawal, and blowing the contents onto a slide. When this technique was employed schizonts were found in nearly every case. Crescents appear suddenly in the peripheral blood on the eleventh day of the disease, increase to a maximum, and then decline. The average duration of the crescent wave is 14 days, but crescents may persist for 66 or even 128 days, when there are frequent relapses. GREEN's conclusion that quinine increased the output of crescents, on the ground that 50 per cent. of his cases had crescents on admission, but 64 per cent. after 7 days' treatment (see this *Bulletin*, 1929, Vol. 26, p. 931) was evidently reached in ignorance of this law (see also AMIES, above p. 597). Quinine in the early stages tends to inhibit crescent production. Crescents are most plentiful in new cases and relapses ; less so in chronic, latent, and recrudescant malaria. In 15 post-mortems, crescents were found in the spleen and bone marrow of about half the cases : none was found in the brain, liver, skin or large intestine. A characteristic feature of

the developing crescent is a dense ring of protoplasm on the outside. The spleen and bone-marrow are the nurseries of the crescents. "There is some slight evidence of parthenogenesis of the macrogametocyte."

W. F.

ZIEMANN (Hans). Ueber die etwaigen Beziehungen gewisser cumarin-haltiger Pflanzen zur Epidemiologie der Malaria. [**Relation of Certain Plants containing Coumarin to the Epidemiology of Malaria.**—*Arch. f. Schiffs- u. Trop.-Hyg.* 1931. July. Vol. 35. No. 7. pp. 410-420. [2 refs.] [Path. Museum, Univ., Berlin.]

The author quotes the views of WILLCOCKS [this *Bulletin*, Vol. 25, p. 557], D'HERELLE and KRYSTO on the absence of malaria from areas in which wild clover is prevalent and the presence of the disease in parts of the country where there is no wild clover. He considers that these are interesting and important observations and has compiled and published in this paper a long list of plants containing coumarin. Profs. BRAUN, GILG, Drs. LIEBISCH and MELCHIOR collaborated with him in this investigation.

E. D. W. Greig.

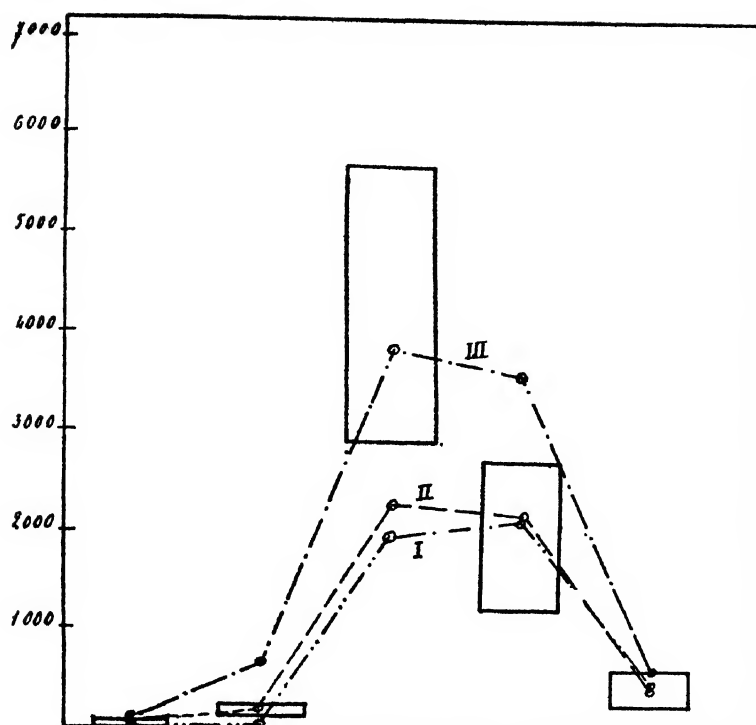
GILL (C. A.). **The "Control" of Malaria with Special Reference to Treatment.**—*Indian Med. Gaz.* 1931. June. Vol. 66. No. 6. pp. 333-335.

In this lecture to the Punjab Branch of the B.M.A. Col. Gill emphasizes the point that the prevention and treatment of disease are so closely connected that they cannot be separated. As the treatment of ankylostomiasis prevents the occurrence of fresh cases, so does the treatment of malaria prevent more malaria, for example on CLEMESHA's tea estates (*ante*, p. 576).

W. F.

MOCHKOVSKI (Ch.). Critérium leucocytaire de la persistance de la malaria. [**The Leucocyte Test in Persistent Malaria.**—*Bull. Soc. Path. Exot.* 1931. July 8. Vol. 24. No. 7. pp. 544-551. With 4 text figs. [4 refs.]

What are the criteria of a definite cure and how can latent malaria be detected? The author claims that his "leucocytic profile" answers these questions. The profile is drawn as follows: An absolute count of the white corpuscles and also a relative count of the different forms is made, and from these the absolute number of each group of cells in a cubic millimeter is calculated. A graph is drawn showing the numbers of basophiles, eosinophiles, neutrophiles, lymphocytes, and monocytes, in the order given, at points equidistant along the base-line. These points are joined to form the curve which is called the leucocytic profile. In a normal blood, the neutrophiles form a sharp peak; but in cases of uncured malaria the curve is flattened, because there is a reduction in the absolute number of these cells. In the figure given below, points which fall within the rectangles lie inside the normal limits; for example the number of neutrophiles in curve III is normal, but the number of eosinophiles is not. When the cure of malaria is established, the neutrophile point on the profile falls into the neutrophile rectangle, and this is a sound proof that there is no latent infection. There is no



Illustrating method of plotting the "leucocytic profile" for three cases (see text of Mochkovski's summary).

			Baso- philes.	Eosino- philes.	Neutro- philes.	Lym- pho- cytes.	Mono- cytes.	Total.
Benign tertian	I	{ Per cent. abs.	0.3 10	1.0 50	43 1900	44 2000	11 500	— 4500
" "	II	{ Per cent. abs.	1.2 60	4.8 240	44 2200	42 2100	8 400	— 5000
Lymphocytic re- action with eosino- philia of un- known cause	III	{ Per cent. abs.	1 100	8.5 800	43 4000	41 3800	6.5 600	— 9300

[Reproduced from the *Bulletin de la Société Pathologie Exotique.*]

real increase of monocytes in malaria, but only a relative rise, due to the diminution of neutrophiles.

W. F.

JORGE (Ricardo). Epidémies nautiques de malaria à forme typhoïdique, pouvant faire suspecter la fièvre jaune. [**Ship Epidemics of Typhoidal Malaria, suggesting Yellow Fever.**—*Bull. Office Internat. d'Hyg. Publique.* 1931. Apr. Vol. 23. No. 4. pp. 682–692. With 1 plate, 3 charts & 1 map. [2 refs.]

In the autumn of 1930 there were severe epidemics of malaria on board cargo boats arriving at Lisbon from ports on the west coast of

Africa (Senegal, the Gambia, Portuguese Guinea). The symptoms in some of the cases resembled typhoid; in others, the rapidly fatal issue, the visceral lesions, and the generalized icterus suggested the diagnosis of yellow fever. Details are given of an outbreak on board a German steamer, which arrived at Lisbon with 10 of her crew of 21 down with fever. The symptoms were sudden onset of high fever, severe headache, diarrhoea, abdominal pain and, in one, abundant epistaxis. Four died; in one, there was generalized icterus: the liver, kidneys and myocardium were yellow and fatty, there was follicular enteritis and gastritis. [There is no mention of black vomit.] The characteristic albuminuria of yellow fever was not present, and examination of the blood and organs demonstrated the presence of *P. falciparum* in large numbers.

W. F.

SURBEK (K. E.). **On Renal Reactions and Nephritis in the Course of Malarial Infections.**—*Riv. di Malarologia*. 1931. Mar.-Apr. Vol. 10. No. 2. pp. 194-196. [6 refs.]

The author recognizes four types:—(1) *Febrile Albuminuria* due to pyrexia; light and transitory, and occurring in 8-10 per cent. of cases. (2) *Renal Reaction (sensu stricto)* with more albumen than the first, and with casts. This form is most common in subtertian. It soon clears up if it is properly treated, but if not it goes on to (3) *Acute Nephritis*. This also responds to quinine, if not left too long. (4) *Quartana-Nephrosis infantum ac adolescentum*, which is a subacute parenchymatous nephritis, particularly associated with untreated quartan malaria in children and adolescents, and frequently accompanied by ascites. It responds to quinine, but there is a tendency to chronicity and relapse [see also GIGLIOLI, this *Bulletin*, Vol. 27, p. 508].

W. F.

JANCSÓ (N.) & D'ENGEL (Rodolphe). **Sur la néphrite dans le paludisme. (Nephritis in Malaria.)**—*Riv. di Malarologia*. 1931. Jan.-Feb. Vol. 10. No. 1. pp. 86-92. [1 ref.] English summary p. 158. [Internal Clinic, Univ. Szeged, Hungary.]

Nephritis is more common in some outbreaks than in others, and occurs more often in malignant tertian than in the other forms of malaria. It usually appears soon after the onset of the disease, and is of the acute haemorrhagic-type. Quinine acts as a specific. In some chronic cases of benign tertian and quartan, there is a chronic nephritis with cardiac hypertrophy; similar cases occur sometimes in malignant tertian, but they are less frequent than the acute form of nephritis. In a wave of malaria which occurred during the years 1898-1901 the author found nephritis in 1.4 per cent. of 2,190 cases.

W. F.

NICOLAU (C. T.) & GINGOLD (N.). **Modifications hématologiques pendant les accès de malaria. [Blood Changes during Malarial Paroxysms.]**—*Bull. et Mém. Soc. Méd. Hôpit. de Bucarest*. 1931. Feb. Vol. 13. No. 2. pp. 19-20. [Filantropia Hosp., & Inst. of Hyg. & Public Health, Bucharest.]

The examinations were made just before, during, and at the end of an attack. The neutrophiles attain their maximum when the fever is

highest. The eosinophiles and monocytes diminish, or disappear, with the rise of temperature, and increase with its fall. The lymphocytes diminish with the fever and increase when the attack is at an end. The destruction of the red cells is greatest at the moment the temperature begins to rise. The number of corpuscles destroyed is 3-8 thousand.

W. F.

MANCA (Serafino). *Sindrome appendicolare di natura malarica. (Appendicular Syndrome of Malarial Origin.)—Riv. di Malarologia.* 1931. Jan.-Feb. Vol. 10. No. 1. pp. 93-98. [9 refs.] English summary p. 158. [Roy. Med. Clinic, Rome.]

The author calls to mind cases in which, on the one hand, patients in malarial districts have shown symptoms of acute appendicitis, but whose appendices when removed appeared in all respects normal, and, on the other, those who have exhibited no symptoms but whose appendicular vessels were thrombosed with malarial pigment.

He relates the case of a woman of 32, who had previously suffered from malaria, showing the typical signs of acute appendicitis—intense pain, at first generalized in the abdomen, settling in the right iliac fossa, a very tender McBurney's point, fever, nausea, vomiting, and characteristic decubitus with flexion of the right thigh. On the third day, these symptoms abated temporarily but returned in less than an hour. The spleen was enlarged. A surgeon was called in and a blood smear taken prior to operation. Numerous subtertian rings were found [the leucocyte count is not stated] and quinine given, 1 gm. by mouth and 1 gm. by injection. The pain was much relieved by the next day and two days later the fever had disappeared and the patient was comfortable. The quinine was continued in smaller doses, 1.5 gm. daily, after the third day and recovery was rapid. [The possibility of appendicular colic occurring in a malarial patient, apart from actual causal connexion, does not seem to have been considered, beyond the statement that "there was no peri-appendicular obstruction."]

H. H. S.

DECOURT (Philippe). *Récidive de paludisme à neuf ans de distance. Transfusion du sang. Transmission du paludisme au donneur. Danger des transfusions de sang aux colonies. [A Malarial Relapse after an Interval of Nine Years. Transmission to the Donor during Transfusion. The Danger of Transfusion in the Colonies.]—Rev. Méd. et Hyg. Trop.* 1931. Jan.-Feb. Vol. 23. No. 1. pp. 32-37. [1 ref.]

A man who had suffered from malaria in the colonies but who had lived near Paris for nine years, free from attacks and from possibility of re-infection, was admitted to hospital with a subcutaneous abscess. Some days after it was opened he had an attack of malaria. The author comments on the extreme rarity of such a long interval between infection and relapse. Before the diagnosis was made, the patient was transfused with blood, and the donor became infected with malaria. The author concludes that in cases where the receiver is suffering from a blood infection it is better to use citrated blood rather than direct arm-to-arm transfusion. The danger of transmitting infection is particularly great in the colonies, and the recipient should be treated with quinine. The donor should be treated as well, if he has schizonts in his blood. The author considers that if the donor has an old-standing malarial infection, it is useless to give him quinine, because this will not destroy the gametes which may

develop into schizonts after inoculation into the recipient. [But there is no cogent evidence that such a development takes place.] The type of parasite which infected the patients is not stated.

W. F.

DOROLLE. Paludisme grave au cours d'un traitement malariathérapique de la paralysie générale. [**Severe Malaria during a Course of Malaria Therapy in General Paralysis.**]—*Bull. Soc. Méd. Chirurg. Indochine.* 1931. Mar. Vol. 9. No. 3. pp. 153-154. [1 ref.]

A patient was inoculated subcutaneously with 5 cc. of blood from a naturally infected donor, in whose blood only *P. vivax* had been found. The patient developed malaria ten days later and nearly died. All three species of malaria parasites were found in his blood, and it is probable that the donor was infected with *P. falciparum* and *P. malariae*, in addition to *P. vivax*, though the former were too scanty to be detected by microscopic examination.

W. F.

SCHADOW (H.). Impfmalaria als Ursache kongenitaler Malaria. [**Con-genital Malaria caused by Inoculation Malaria.**]—*Muench. Med. Woch.* 1931. June 5. Vol. 78. No. 23. pp. 947-948. [26 refs.] [Children's Clinic, Univ., Hamburg-Eppendorf.]

A female during pregnancy received a course of malarial therapy for general paralysis. After six rigors labour commenced and she gave birth to a living child. She had received one dose, 0.25 gm. of quinine, to modify the fever. Three weeks after birth the infant began to get attacks of fever and examination of the blood showed the presence of *P. vivax*. It became profoundly anaemic. At the sixth week of life the spleen was enlarged and extended to a hand's breadth below the costal margin. Blood transfusion was carried out and quinine administered. It was discharged from the Clinic at the seventh month of life in good condition although the spleen was still distinctly enlarged. Examined five months later the spleen was still palpable, but the child was otherwise healthy. No malarial parasites could be found in the blood even after administration of adrenalin.

E. D. W. Greig.

JANKELSON (I. R.). **Transmission of Malaria through Injection of Whole Blood.**—*Jl. Amer. Med. Assoc.* 1931. July 18. Vol. 97. No. 3. p. 177. [City Hosp., Boston.]

Several ounces of an Italian's blood were inoculated into his anaemic infant, which soon afterwards developed quartan malaria. Quartan parasites were also found in the blood of the father. He had no clinical symptoms of malaria, but admitted that about once in 12 or 24 months he had a chill which lasted for an hour and was followed by perspiration. He had suffered from malaria as a child, but he had lived in Boston for the last 20 years. The author concludes that "a man may be a carrier of the plasmodium for almost 40 years."

W. F.

SNIJERS (E. P.). De behandeling der verschillende vormen van malaria. [**The Treatment of the Different Forms of Malaria.**]—Reprinted from *Aanwinsten op diagnostisch en therapeutisch gebied.* [1931.] pp. 443-484. [Refs. in footnotes.]

Clinically a fever of intermittent character recurring daily with shivering occurring at the same time of day must raise the suspicion of

malaria, but need not necessarily be malaria. Liver abscess, tubercle, otitis media, a septic focus, pyelitis, cystitis and lymphogranulomatosis are mentioned as some examples of non-malarial causation. One symptom which always accompanies the malaria attack is a marked urobilinuria.

The answer to the question whether quinine acts directly or indirectly upon the malaria parasite is not yet satisfactory, but the author maintains that the process of cure is essentially one of body resistance and not to be compared with *in vitro* tests of the death of the parasite. Quinine is not, therefore, a *therapia sterilisans magna*, capable of destroying the malaria parasite so to speak in the human test tube. Of all the medicaments, other than quinine, which may be used plasmochin is the most noteworthy. Its dosage has to be carefully adjusted, especially in ill-fed and enfeebled patients; a cyanosis may make its appearance due to methaemoglobinaemia and this should be watched for, not so much by a diminution of blood haemoglobin as by an increased urobilinuria. A very usual type of dosage is one of 10 mgm. plasmochin together with 250–300 mgm. quinine four times a day for 10 days. The administration of quinine, as the mainstay of malaria treatment, is specially considered. Its proper absorption can be followed by the addition to 5 cc. albumin-free urine of the reagent—pot. mercury iodide 10; glacial acetic acid 5; distilled water 100. A turbidity develops which disappears with heating and reappears on cooling. A choice of the many preparations of quinine presents a difficulty and it is well to know their varying alkaloidal content. Rate of absorption must also be taken into account. Dosage is regulated to some extent by weight, 1 gm. of hydrochloride for a 60-kgm. weight and 1.5 gm., but not more than this, for a 90-kgm. weight. A course of treatment at 200 mgm. 5 times a day for 5 or at most 10 days should be sufficient. After this the relapse should be watched for and the same treatment renewed. In this way 1, 2, or 3 series of treatments should suffice and this method is much better than a prolonged course. In cases of malaria where oral administration of quinine is impossible then, but only then, must injection be employed and this may be intramuscular or intravenous. Painful infiltrations, necroses, abscesses and lastly tetanus are to be avoided by strict attention to asepsis. Such a solution as quinine hydrochloride 3; antipyrin 2; water to 10 cc. fractionally sterilized at 80–90° C. gives no infiltration in a dose of 1.1 or 2.2 cc. along with 5 times the amount of sterile normal salt solution as diluent.

The quinine prophylaxis of malaria, admittedly a controversial subject, is shortly considered. It seems necessary to use what are really therapeutic doses such as 2/3–1 gm. daily for at least 10 to 14 days after infection or during an epidemic.

W. F. Harvey.

WILLOUGHBY (Hugh) & ASLETT (Edward). **The Treatment of Malaria and Blackwater Fever, with Notes on the Pre-Blackwater State.**—*Jl. Roy. Nav. Med. Serv.* 1931. Apr. Vol. 17. No. 2. pp. 95–103. [Hosp. for Trop. Diseases, London.]

“The optimum maximum oral dosage of quinine is 10 grains given thrice daily in B.T. and quartan infections, and 10 grains given twice

daily in M.T. cases. Any excess is likely to lead to toxic symptoms, especially in weakly individuals, and is waste of a valuable drug." As a general rule B.T. and quartan need three months' treatment. Plasmoquine compound is advised where there is intolerance of quinine, in pre- and post-blackwater fever cases, and in pregnant women. Four seven-day courses of 2 tablets twice a day are recommended, with four-day intervals, followed by a fifth course of one tablet three times a day. Each tablet contains 0.01 gram plasmoquine and 0.125 gram quinine. The patient should remain in bed for the first two courses. Glucose should be taken daily, and if toxic symptoms appear the dose of plasmoquine should be decreased. "Individuals who show signs of cyanosis are nearly always completely cured." [The daily dose of quinine, 12 grains, is not big enough for all cases of M.T. The quantity of plasmoquine seems unnecessarily large. Few malaria patients can be kept in bed for a fortnight.] The authors believe that a "pre-blackwater state" is readily recognizable; they consider the following points to constitute a pre-blackwater syndrome. All or some of the following signs and symptoms may be exhibited: (a) persistent headache; (b) dirty furred tongue; (c) icterus, especially noticeable in the conjunctivae; (d) nausea and vomiting; (e) loin pain, most marked over the kidneys; (f) enlarged tender spleen; (g) enlarged tender liver; (h) the presence of albumen, bile salts and bile pigments in the urine; (i) diarrhoea or sometimes constipation. [The "pre-blackwater state" is evidently far more common than actual blackwater.]

W. F.

VEDDER (E. B.) & MASEN (J. M.). **The Determination of Quinine in the Blood as a Guide to the Treatment of Malaria.**—*Amer. Jl. Trop. Med.* 1931. May. Vol. 11. No. 3. pp. 217–229. With 1 text fig. [5 refs.]

"The methods reported for the determination of quinine in the blood, not only make a scientific treatment of malaria possible, but open a door to a new line of experimental work on the toxicity of quinine to the various forms of the different malaria parasites." Patients suffering from benign tertian malaria were given 10 grains of quinine sulphate in capsules at 9 a.m. and 1 p.m. [Apparently irrespective of weight.] The quinine in the blood was estimated in samples collected half an hour, 1½ hours, and 2½ hours later. In a number of patients a very considerable concentration of quinine was reached within half an hour after administration. There is apparently no excuse for intramuscular injections, and intravenous injections should be used only in cases of coma where the drug cannot be given by the mouth. A single dose of 10 grains never produces the maximum obtainable concentration in the blood; in almost every case higher concentrations were obtained in the afternoon after the second dose of 10 grains. Some individuals must have an unusually efficient mechanism for either the excretion or destruction of quinine, for, after a dose of 10 grains one patient may have only 2 mgm. per litre in the blood and another 5 mgm. "This is quite probably the reason why, on a standard treatment, one individual will be cured, and another will relapse." The following methods were employed to estimate the amount of quinine in the blood:—

METHOD 1.

Preparation of Reagents and Standards.

- " 1. A 10 per cent. solution of silico-tungstic acid in distilled water.
" 2. A 0.5 per cent. normal solution of hydrochloric acid.
" 3. Quinine standards. A stock solution is prepared containing 200 mgm. anhydrous quinine in 1,000 cc. of 0.5 N HCl. 1 cubic centimeter of this solution contains 0.2 mgm.
" From this four standard solutions are prepared all dilutions being made with 0.5 N HCl.
" 1. Five-tenths cubic centimeter stock solution is diluted to 100 cc. Five cubic centimeters of this solution contain 0.005 or 1 mgm. per liter.
" 2. One cubic centimeter stock solution diluted to 100 cc. Five cubic centimeters contain 0.01 mgm., 2 mgm. per liter.
" 3. Two cubic centimeters stock solution to 100 cc. Five cubic centimeters contain 0.02 or 4 mgm. per liter.

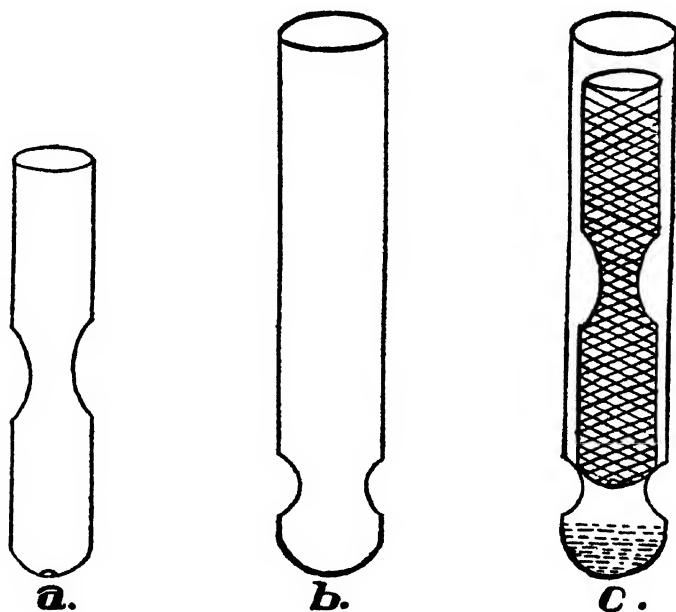


Fig. 1.

Extraction apparatus for determining the concentration of quinine in the blood.

[Reproduced from the *American Journal of Tropical Medicine.*]

- " 4. Three cubic centimeters stock solution to 100 cc. Five cubic centimeters contain 0.03 or 6 mgm. per liter.

" These standards cover routine procedure enabling estimations of quinine in the blood from 1 to 8 mgm. per liter. Higher standards may be prepared as required. These solutions deteriorate when exposed to light and must be kept in brown glass bottles. If protected from the light they are permanent for at least one year.

" *Technique.* A small circle of absorbent filter paper cut from a thick Whatman extraction thimble is placed in the bottom of tube "a" of the extraction apparatus, (Fig. 1) which may be made in any laboratory. This tube is then packed with long fiber, acid-washed asbestos to within about 2 cm. of the top. The asbestos must not be packed too tightly, otherwise the ether will not percolate through the blood properly. Neither must the

packing be too loose or the blood will not be properly absorbed on the asbestos and some will escape to the bottom of the tube into the ether. The constriction is placed in tube "a" in order to prevent blood from flowing down the walls of the tube thus escaping absorption by the asbestos.

"Five cubic centimeters of oxalated blood is pipetted on to the asbestos and a small pledget of cotton placed in the mouth of the tube, which is then inserted in tube "b." Ether is poured through the top of tube "a" until at least 5 cc. has percolated into the outer tube "b." The extractor is connected to a reflux condenser and is immersed in a warm water bath up to the level of the ether in tube "b." The extraction is then allowed to proceed for two hours. When extraction is complete, the inner tube is removed, and the outer tube containing the ether extract is placed in a boiling brine bath and evaporated to dryness. Five cubic centimeters of 0.5 N HCl is added and the tube returned to the brine bath for two minutes to facilitate solution of the quinine. The solution is filtered while hot, through a No. 42 Whatman filter, and the filtrate allowed to cool to room temperature.

"Three standards are prepared equivalent to 2, 4, and 6 mgm. per liter by measuring 5 cc. of the proper standard solutions into small test tubes. To each of the standards is added 0.1 cc. of the 10 per cent. solution of silico-tungstic acid, and to 3 cc. of the unknown is added 0.06 cc. of the same solution. Standards and unknown are then immersed together in a boiling water bath for five minutes, after which they are removed and cooled rapidly in running water. The unknown is then matched in the nephelometer against the nearest approximate standard."

METHOD 2.

Preparation of Solutions and Reagents.

"1. *Gum arabic.* Two grams of pure gum arabic (U.S.P. is suitable) is shaken with 100 cc. of distilled water until completely dispersed. The suspension in a Florence flask is immersed in a boiling brine bath for one hour to destroy reducing enzymes present in the gum, and is then filtered while still hot. On cooling the gum is ready for use, and will keep indefinitely if stoppered and kept in a refrigerator. It keeps about two months in the laboratory.

"2. *A stock standard* is prepared by dissolving 100 mgm. of pure anhydrous quinine in 500 cc. of 2 N sulphuric acid saturated with zinc sulphate. The working standards are prepared by diluting the stock solution 1:100, 2:100, 3:100 etc., with 2 N sulphuric acid-saturated zinc sulphate solution. Five cubic centimetres of these dilutions contain 0.01, 0.02, and 0.03 mgm. quinine respectively, or 2, 4, and 6 mgm. per liter. These standards must be protected from the light, by brown glass bottles. As the sensitivity of the test is affected by the concentration of the zinc sulphate, the zinc sulphate-sulphuric acid solution for the preparation of the standards should be the same as that used for dissolving the quinine extracted from the blood.

"3. *Two N sulphuric acid-zinc sulphate solution.* The purest crystalline salt, $\text{ZnSO}_4 \cdot 7\text{H}_2\text{O}$, should be used. The 2 N sulphuric acid should be saturated with the salt at temperatures somewhat below those encountered in the ordinary room temperature, as otherwise trouble will be experienced on account of the zinc sulphate crystallizing out as soon as the room temperature drops. Thus, if the minimum laboratory temperature is 20° C. the solution should be saturated at a temperature of 15 to 17° C., and should then be filtered.

"4. *Potassium bismuthous iodide reagent.* This is a reagent commonly used in the detection of alkaloids, and there are a number of formulas for its preparation. The one outlined gave the best results. Place 4.68 grams of bismuth oxide in 80 cc. concentrated HCl, and add water to 300 cc. Then dissolve 20 grams potassium iodide in water and dilute to 700 cc.

"Technique. Extraction of the blood is performed as described in Method 1. As soon as extraction is complete and the ether is evaporated, 5 cc. of 2 N sulphuric acid saturated with zinc sulphate is added, and the tube immersed in the boiling brine bath for three minutes in order to bring the quinine into solution. The solution while hot, is filtered through a No. 42 Whatman filter, and, after having cooled to room temperature, an aliquot of the filtrate, 3 cc., is measured into a small test tube. In three similar test tubes measure 5 cc. of each of the three quinine standard solutions. Immerse both standards and unknown in a cold water bath (20 to 25° C.) for five minutes in order to bring them to the same temperature. Then add to the standard 0.1 cc. and to the unknown 0.06 cc. of the gum arabic solution, followed by the same amounts of the potassium bismuthous iodide reagent (0.1 cc. to the standard and 0.06 cc. to the unknown). Mix and compare immediately in the colorimeter, with the standard set at 10 mm. The comparisons must be made within two minutes from the time that the solutions are mixed, as the color changes on standing. The calculation is made in the usual manner as described under Method 1.

"As in most colorimetric procedures, the closer the strength of the standard approximates that of the unknown, the more accurate will be the colorimetric matching. However for practical purposes it is sufficient to prepare the three standards just described and comparing the unknown with the nearest standard."

W. F.

MANSON-BAHR (Philip). **Quinine Therapy in Malaria.**—*Lancet*. 1931. Apr. 18. pp. 843–846.

The author believes that in the primary attack it is possible to extirpate the infection by prompt and energetic quinine treatment, but that in each subsequent relapse the parasites are more resistant. (JAMES, see above, p. 568, does not share this belief.) The removal of a patient to a temperate climate increases his bodily resistance, and shortens the life of the parasite. In a temperate climate, the life of the benign tertian is about three years, the quartan perhaps longer, and the subtertian only about one year. An agreeable way in which to give quinine in solution is as an effervescing mixture with citric acid grains 10, to which are added ammonium carbonate grains 4, and potassium carbonate grains 20. It is a great mistake, the author considers, to stop the quinine soon after the attack; it should be continued, in benign tertian cases, for six weeks. Children should be given one-twentieth of the adult dose for each year of age. Intravenous injections of the bihydrochloride, 10 grains in 10 cc. of distilled water, are recommended in pernicious subtertian cases, and it is advised that 5 minims of a 1:1000 solution of adrenalin should be given at the same time in order to counteract the lowering of blood pressure produced by the quinine. Dr. Manson-Bahr thinks that great caution should be observed in giving quinine to anaemic patients with severe toxic subtertian malaria, because he is afraid of blackwater fever. He recommends a daily dose of no more than 5 grains to begin with, and its gradual increase. [Many tropical practitioners believe that the danger of producing blackwater is far less than the danger from the malaria parasites, and that, in such cases, the parasites ought to be destroyed without a moment's delay.]

W. F.

BLANC (Georges) & CAMINOPETROS (J.). De l'emploi de l'hydrate de quinine et d'hydrolactate de quinine par injections intraveineuses et sous cutanées dans le traitement du paludisme. [**Quinine Base and Quinine Lactate by Intravenous and Subcutaneous Injection.**]—*Rev. Prat. Malad. des Pays Chauds.* 1931. June. Year 10. Vol. 11. No. 6. pp. 275-8, 280-82. With 3 text figs. [3 refs.] [Pasteur Inst., Athens.]

To give quinine by the mouth is rather a shot in the dark, because one cannot be sure that the patient swallows it. [A drop of Mayer's reagent added to the urine will settle the question.] Most salts of quinine are likely to cause necrosis when injected; therefore the authors tried quinine base. First they used "collobiase", which gave good results but did not contain enough quinine. Subsequently they were able to obtain a solution containing 1 gram of quinine base in 5 cc. of water. [They do not say how this was done.] In order to obtain a more speedy action lactate of quinine was mixed with the quinine base [amount not stated]. After a number of trials they conclude that the solution is absolutely innocuous, and produces neither general nor local reaction when it is inoculated.

W. F.

HUGHES (T. A.). **The Effect of Intravenous Injections of Quinine on the Electrocardiogram in Man.**—*Indian Jl. Med. Res.* 1931. July. Vol. 19. No. 1. pp. 113-119. With 5 text figs. [4 refs.]

Quinine is a circulatory depressant and its administration by the intravenous route is not devoid of danger. Nine patients received 6 grains dissolved in 10 cc. of saline, and three 10 grains dissolved in 20 cc. of saline. The following are the author's conclusions:—

"The changes produced in lead II of the electrocardiogram by the intravenous injection of quinine in anti-malarial doses were studied in 12 patients. The most constant effect was a reduction in height or abolition of the T wave. Other effects observed were tachycardia, increase in height and width of the P wave, shortening of the P-R interval, reduction in height of the R wave and increase of the S wave. In one individual the P-R interval was reduced to 0.04 sec. Collapse, which was promptly relieved by adrenalin, occurred [? occurred] in two cases, in one of whom there was inversion of the T wave in leads II and III in the control curves. Symptoms were severe in this patient and were accompanied by marked electrocardiographic changes including depression of the R-T segment."

W. F.

SIDARI (Carlo). Il chinino nella malaria in gravidanza. [**The Action of Quinine in Malaria in Pregnancy.**]—*Riv. Sanitaria Siciliana.* 1931. May 1. Vol. 19. No. 9. pp. 674, 677-678.

The author discusses the action of quinine and states that in small, divided doses it affects the uterine muscle directly, but in large doses it has a sedative effect on that viscus while lowering the temperature and destroying the plasmodium. Moreover, it is but rarely that quinine initiates uterine contractions; also, he states, statistics show that malaria has a very detrimental effect on pregnancy, "in 10 per cent. of cases it causes abortion, in 40 per cent. premature birth, in 20 per cent. death of the foetus" [the source whence these figures are obtained

is not given]. Hence, he is strongly in favour of giving quinine to pregnant women who are suffering from malaria, maintaining that it cures the malaria, and prophylactically prevents premature expulsion of the foetus.

H. H. S.

MANIFOLD (J. A.). **Report on a Trial of Plasmoquine and Quinine in the Treatment of Benign Tertian Malaria.**—*Jl. Roy. Army Med. Corps.* 1931. May & June. Vol. 56. Nos. 5 & 6. pp. 321–338; 410–423. [22 refs.]

The standard treatment adopted was : one tablet of 0.02 grams of plasmoquine together with 10 grains of quinine every morning and evening. This was given daily for 21 days, and in malignant tertian cases the course was followed by 0.04 grams of plasmoquine daily for 5 days. The treatment was entrusted to a number of medical officers in different parts of India, with instructions that a medical officer, or an assistant surgeon, should always be present when the dose was administered. The patients consisted of British and Indian soldiers, and 3,187 of them completed the 21 days' course. The following are the main conclusions :—

(1) The treatment may be given to all classes of British soldiers in India, irrespective of their physique. The same holds good for the great majority of Indian sepoys and followers, but in a few, about 0.1 per cent., it is possible that an attack of blackwater fever may be precipitated. "As in both British and Indian cases there appears to be a small percentage with a definite idiosyncrasy to the toxic action of plasmoquine, patients will require to be kept under observation, and should be excused duty during the three weeks' treatment." (2) As regards the prevention of relapses, "there is no doubt that it is *most* efficacious and a great advance on the ordinary quinine treatment." [Possibly, better supervision in giving the drugs was a factor.] The period of observation varied from 3 to 6 months. (3) It is definitely unsafe to issue plasmoquine to patients not under medical supervision. Good results might be met with in ninety-nine cases, and disaster in the hundredth. There were two deaths and two serious cases of methaemoglobinuria among the Indians.

Case 1 had benign tertian rings in his blood on the first day of treatment : on the 4th day, there were tertian gametocytes and crescents : on the 6th day, there were rigors and vomiting, with a temperature of 102.4° F., and plasmoquine was stopped : on the 7th day, there was marked jaundice, bile-coloured urine, severe abdominal pain and vomiting ; the man died suddenly and unexpectedly in the afternoon. *Case 2* had benign tertian rings in his blood when treatment was begun. On the 4th day, his temperature, which was normal on the 2nd and 3rd days, rose to 101.4°, no abdominal discomfort, no albumen in the urine : on the 5th day, temperature 102° F., passing dark coloured urine, seriously ill, plasmoquine stopped : 6th day, jaundice marked, bilious vomiting, cyanosis, methaemoglobinuria : 9th day, cyanosed, still passing port wine-coloured urine : 10th day died, after being unconscious for 48 hours. Post-mortem, fatty degeneration of liver and kidneys ; renal tubules filled with amorphous debris. *Case 3*, had benign tertian rings. On the 5th day of treatment, his temperature, which had been normal for three days, went up to 104° F., there was marked jaundice, bilious vomiting, intense abdominal pain, and dark-coloured urine containing tube casts and blood corpuscles. He gradually recovered. *Case 4*. Benign tertian : jaundice appeared on the

4th day and plasmoquine was stopped: 5th day blood and bile in urine. He recovered quickly.

The author makes the following comments on these cases:—Case 1—"As a post-mortem was refused, the cause of death must remain uncertain. Neither the officer commanding the hospital concerned nor the medical specialist of the district was of opinion that death could be attributed to the plasmoquine." Case 2—"appears to have presented all the symptoms of a typical attack of blackwater fever." Case 3—"was similar in all respects also to a case of blackwater fever." Case 4—"appears to have been very much milder in type."

W. F.

KLIGLER (I. J.) & MER (G.). **Studies on Malaria VII.—Relapse Rate after Quinine-Plasmoquine Treatment.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1931. Aug. 8. Vol. 25. No. 2. pp. 121–127. [3 refs.] [Hyg. Dept., Hebrew Univ., Jerusalem.]

Forty-seven heavily infected children in the untreated Bedouin village of Melaha were treated as follows for 5 days:—18 were given quinine-plasmoquine mixture; 17 were given quinine; 12 were given no drugs. Their blood was examined weekly for 7 weeks, with the following results: there were 2 relapses in 17 cases [? 18] in the plasmoquine group; 7 relapses in 17 cases in the quinine group; 12 relapses in 12 untreated control cases. In the village of Almenieh, where treatment had been carried out during the previous year, the results were less favourable; for out of 21 children treated with quinine-plasmoquine 12 relapsed. The treatment was therefore repeated at the first village, Melaha, with the result that there were 19 relapses in 53 cases. The authors conclude that though chinoplasmine [quinine-plasmoquine mixture] gives a lower relapse rate than quinine alone, the results of treatment in a group previously treated are not as favourable as in a virgin group. "partial treatment for gametocyte suppression . . . apparently results in the selection of drug resistant strains." [The evidence given here cannot be accepted as conclusive.]

W. F.

DE MELLO (Froilano), BRÁS DE SÁ (L. J.) & D'ABREU (Mariano). Contribution à l'étude du traitement du paludisme par la plasmoquine.—[**Treatment of Malaria by Plasmoquine.**]—*Arquivos da Escola Méd.-Cirurg. de Nova Goa.* Ser. A. 1931. No. 6. pp. 715–753.

The authors confirm the general findings of others in the therapeutic use of plasmoquine. The patients treated by them were free from relapses if they stayed in a malaria-free locality. Seventeen per cent. of those who remained in the place where they contracted fever relapsed after treatment, but it was impossible to exclude the possibility of re-infection.

W. F.

DE BUEN (Sadi). Nuevas notas sobre la plasmoquina compuesta en el tratamiento de la terciana benigna. [**Further Notes on the Treatment of Benign Tertian Malaria with Plasmoquine Compound.**]—*Medicina Paises Calidos.* Madrid. 1931. May. Vol. 4. No. 3. pp. 214–216. [1 ref.] [Antimalaria Inst., Navalmoral de la Mata, Cáceres, Spain.]

The author refers to his previous records (see this *Bulletin*, Vol. 26, p. 374) and gives an account of 97 children, from 1 to 15 years of age,

suffering from benign tertian malaria, treated between June and December 1929, for 3 weeks, the first and third weeks with plasmoquine co., the second with quinine only. Eleven of these (11·3 per cent.) relapsed in the first four months of 1930. Of 49 patients between 15 and 60 years similarly treated none relapsed. For children, therefore, it would appear that three weeks' treatment is inadequate; the author recorded that when treatment was kept up for a month (in his previous trials) there were no relapses.

H. H. S.

DRENOWSKY (Angel K.). Die Malariabekämpfung mit Chinoplasmin in den Malariadörfern im Kreise Burgas während des Versuchsjahres 1930. [**Chinoplasmin as an Antimalarial Measure in Malarial Villages in Bulgaria during 1930.**]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1931. July. Vol. 35. No. 7. pp. 420-424.

As he was not satisfied with the treatment of acute malaria with plasmochin compound, in 1927 he increased the quantity of quinine and gave $1\frac{1}{2}$ gm. and only 0·02 gm. plasmochin daily. He approves of Sinton's method, namely, for 10-20 days continuously daily doses of 1·2 gm. quinine and 0·04 gm. plasmochin. During 1930 tablets of chinoplasmin [each tablet consists of quinine sulphate 0·3 gm. (gr. $4\frac{1}{2}$) and plasmochin 0·01 gm. (gr. $\frac{1}{6}$)] were substituted. The tablets were efficacious and well tolerated; although the quantity of plasmochin administered per day was small, in adults at most 0·04 gm. per day, the gametocytes disappeared from the blood in 5-6 days. Results were observed in 111 malarial cases. The investigation is still in progress and further results will be communicated in due course.

E. D. W. Greig.

MORISHITA (Kaoru). **Studies in the Treatment of Malaria. I. General Introduction and Routine Methods.**—*Taiwan Igakkai Zasshi (Jl. Med. Assoc. Formosa).* 1931. Jan. Vol. 30. No. 1 (310). [In Japanese. [9 refs.] English summary pp. 8-10.]

ODA (Teibun), MORISHITA (Kaoru) & NAMIKAWA (Hiroshi). **II. Experimental Treatment with Plasmoquine (I Report) Effect of the Short Course Treatment in Various Forms of Malaria.**—*Ibid.* [In Japanese. [1 page of refs.] English summary pp. 10-12.]

—, — & —. **III. The Therapeutic Effect of Saiko, an Indigenous Drug in the Orient, upon the Malarial Infections.**—*Ibid.* [In Japanese. With 8 charts. English summary pp. 12-13.] [Govt. Research Inst., Formosa.]

Drugs are tested on cases of chronic malaria among Formosan Chinese at the Institute for Experimental Malaria Therapy, established at Taihoku in 1929. There is hardly any possibility of re-infection there, but as a precaution the wards are screened. The patients are kept under observation for eight weeks after the cessation of treatment, and thick films are frequently examined. The term "cure" signifies no parasitic relapse during this period. When 0·04 to 0·06 gram of plasmoquine were given to patients with benign tertian and quartan, the relapse rate was 12·5 per cent. in the first, and nil in the second. [The numbers of patients are not given in the English summary.] All the cases of malignant tertian were given 0·06 gram daily, and they all relapsed. (Compare MANIFOLD, above, p. 1007.)

A drug named Saiko, which has long been used by the Chinese in malaria and other fevers, was also tested. Botanically it includes three different herbs, *Potentilla chinensis* (Rosaceae), and two umbelliferous plants. It had no effect upon the malaria parasites, and the authors conclude that it is useless.

W. F.

MORISHITA (Kaoru) & NAMIKAWA (Hiroshi). **Studies in the Treatment of Malaria. IV. Therapeutic Effect of Osvarsan upon Various Forms of Malaria. V. Influence of Jozan-Decoot upon Malarial Infection.**—*Taiwan Igakkai Zasshi* (Jl. Med. Assoc. Formosa). 1931. July. Vol. 30. No. 7 (316). [In Japanese. English summaries pp. 55 & 56.] [Govt. Research Inst., Formosa.]

Osvarsan is an oral antisyphilitic drug, made in Japan, with the same constitution as stovarsol, and the chemical definition 4-oxy-3-acetyl-amino-phenylarsinic acid. The authors found that it caused disappearance of both the parasites and fever of benign tertian malaria, but it did not prevent subsequent relapses. It had no destructive action upon subtertian or quartan parasites. Daily doses of 0.75 to 0.8 grams were given, either for a week continuously or for two periods of 3 days with an interval of 4 days. In one case, where 0.8 gram was given every day, severe intoxication occurred with fever, exanthem, and cerebral symptoms.

Under the name Jozan a number of plants is used in the Far East as a remedy for malaria. The two plants most commonly used are *Orixa japonica* and *Hydrangea macrocephala*. These were administered to cases of all the three forms of malaria, without any apparent effect.

W. F.

DE NORONHA (Remo). Acção da plasmocina nas esplenomegalias palustres. (Elementos clinicos.) [**Effect of Plasmoquine on Malarial Splenomegaly.**]—*Arquivos da Escola Méd.-Cirurg. de Nova Goa*. Ser. A. 1931. No. 6. pp. 959-976.

Details are given of 13 patients with enlarged spleens from malaria infection, 6 treated with plasmoquine 3 tablets daily, 6 with plasmoquine compound, 12 tablets daily in 3 doses of 4 each; in one case the form of the drug is not stated.

The final note as regards the spleen was made about 6 months after starting treatment. Of the 6 who were given plasmoquine only, in four the spleen was completely reduced. Of the 6 who had the compound, in one the spleen was reduced to normal, in one there was considerable reduction, in three it was softened to the feel, but not reduced in size to any extent.

[In judging the results other factors would have to be taken into account, but, regarding the splenomegaly alone, the above would seem to show that simple plasmoquine had the greater effect.]

H. H. S.

MANSON-BAHR (Philip). **The Chemoprophylaxis of Malaria.** [Correspondence.]—*Lancet*. 1931. Aug. 22. pp. 425-426. [6 refs.]

Dr. Manson-Bahr draws attention to the debt of gratitude which workers in tropical medicine owe to Colonel JAMES and his co-workers

for their demonstration of the value of plasmoquine* as a prophylactic. Dr. Manson-Bahr, for the last three years, has advocated the use of plasmoquine compound as a prophylactic to patients returning to malarious places in the tropics. It is his practice to prescribe one tablet of plasmoquine compound (plasmoquine 0.01 gram, quinine sulphate 0.125 gram), last thing at night during the malaria season, but never on an empty stomach. The results have been most satisfactory.

W. F.

REHBEIN (Max). Heilung eines Falles von Malaria tertiana mit Chininidiosynkrasie durch Plasmochin. [**Cure of a Case of Benign Tertian Malaria with Quinine Idiosyncrasy by Plasmochin.**]—*Arch. f. Schiffsu. Trop. Hyg.* 1931. July. Vol. 35. No. 7. pp. 435–436. With 1 fig.

Patient had received plasmochin compound for the treatment of malaria and developed haemorrhages under the skin and bleeding from various mucous membranes; when he was placed on pure plasmochin without quinine the symptoms did not develop and he got rid of the malaria. The author considers this a case of idiosyncrasy to quinine.

E. D. W. Greig.

RUSSELL (Paul F.). **Plasmochin Simplex, a Prophylactic Drug in Avian Malaria. Preliminary Report.**—*Amer. Jl. Trop. Med.* 1931. July. Vol. 11. No. 4. pp. 279–284. With 3 text figs. [3 refs.] [Bureau of Science, Manila.]

Plasmochin simplex was administered daily to canaries for a period of seven days by means of intramuscular injections of 0.00016 to 0.0002 grams. The birds were inoculated on the third day, and some of them on later days, with blood containing the parasites of avian malaria. None of them developed malaria except a pair inoculated on the seventh day, a few hours after having received their last dose of plasmochin. On the contrary, canaries similarly treated with 0.005 gram doses of quinine all developed malaria.

W. F.

DE LA CAMARA (Pedro) & MORALEDA (Carmen). Observations de trente et un cas de paludisme traités par le quiniostovarsol. [**Thirty-One Cases of Malaria treated with Quiniostovarsol.**]—*Bull. Soc. Path. Exot.* 1931. Apr. 15. Vol. 24. No. 4. pp. 335–356. With 3 graphs. [13 refs.] English summary.

—. Nota sobre la eficacia del quiniostovarsol en la prevención de las recidivas. [**The Efficiency of Quiniostovarsol in preventing Malarial Relapses.**]—*Medicina Paises Calidos.* Madrid. 1931. Sept. Vol. 4. No. 5. pp. 426–429. [6 refs.] English summary (5 lines). [Antimalaria Inst., Navalморal de la Mata, Cáceres, Spain.]

The author, with Moraleda, reported [*ante*, p. 601] on 31 cases of malaria treated with quiniostovarsol, dealing with its effects in

* An editorial footnote to Dr. Manson Bahr's letter is as follows: "There has been some confusion about the name and composition of this drug. We are assured by Bayer Products, Ltd., the London agent of its makers, that Plasmoquine, as now issued, is identical with the preparation in the first instance issued under the name of Beprochin. There has been no alteration in its composition. Plasmochin is simply the continental spelling of Plasmoquine. The makers state that Plasmoquine is N-diethylamino-isopentyl-8-amino-6-methoxy-quinoline, obtained synthetically. It is not derived from quinine—Ed. L."

expelling parasites from the circulation, in reducing temperature and splenomegaly, etc. In this paper are described the conditions of the patients 8 months after the treatment ceased. Of 15 with benign tertian infection (one patient is excluded, having shown intolerance of the drug) 9 had relapsed. These relapses could not be attributed to inadequate dosage or courses, for only two of the nine had failed to complete the third course of ten days, whereas three of the six who did not relapse received only two courses. Among 11 patients with subtertian malaria none had relapsed, although one had previously relapsed after plasmoquine co. and two after quinine. The conclusion is drawn that quiniostovarsol is very rapidly effective, as regards its immediate action, on *P. vivax*, but that relapses occur in the majority after a varying interval; on *P. falciparum* the action is slower but more complete seeing that none of the patients so infected relapsed.

H. H. S.

- i. MONIER (H. M.). Essai d'un dérivé de la quinoléine (664 Fourneau) dans la malaria expérimentale. [**A Trial of Fourneau 664, a Quinolin Derivative, in Experimental Malaria.**—*Bull. Soc. Path. Exot.* 1931. Feb. 11. Vol. 24. No. 2. pp. 93-97.]
- ii. —. Essais thérapeutiques du 710 Fourneau dans quelques cas de paludisme. [**Fourneau 710 in the Treatment of Malaria.**—*Ibid.* pp. 97-101. With 2 charts in text.]
- iii. —. Action de la plasmoquine simple dans un cas de paludisme à *P. praecox*. [**Plasmoquine in a Case of Subtertian.**—*Ibid.* pp. 101-104. [1 ref.]

i. Fourneau 664 is allied to plasmoquine. Eight general paralytics who had been therapeutically infected with benign tertian, were treated with intramuscular injections of the drug. The author concludes that it has an action on the benign parasite, that 0.04 gram a day is insufficient, and that 0.1 gram is dangerous. [The drug is evidently unsatisfactory].

ii. Fourneau 710, a yellow powder readily soluble in water, proved very active against *P. vivax*; in one case, a single dose of 0.04 gram was enough to clear the blood of parasites. It had no action in subtertian.

iii. A patient, intolerant of quinine, was successfully treated with plasmoquine.

W. F.

- MONIER (H. M.). Association du 710 Fourneau avec la quinine et le stovarsol. [**Association of Fourneau 710 with Quinine and Stovarsol.**—*Bull. Soc. Path. Exot.* 1931. May 13. Vol. 24. No. 5. pp. 378-382. [1 ref.]

Good results were obtained in 4 cases of subtertian and 2 of benign tertian. The maximum dose of 710 Fourneau is 0.02 gm., and the optimum amount to be given in one day is between 0.06 and 0.08 gm. After a week's treatment there should be a week's rest. Larger doses may cause violent headache, shivers and sweats.

W. F.

SERGEANT (Edm.), SERGEANT (Et.), CATANEI (A.), TRENSZ (F.) & SERGEANT (A.). Etude de l'action du "710" Fourneau sur le paludisme des oiseaux & *Plasmodium relictum* (note préliminaire). [The Action of "710 Fourneau" upon Bird Malaria.]—*Ann. Inst. Pasteur*. 1931. July. Vol. 47. No. 1. pp. 57-62. [4 refs.] [Pasteur Inst. of Algeria, Algiers.]

Canaries to the number of 533 were employed in these tests. A single dose of 0.00025 gram of 710 may kill a canary, but if it is given in divided doses during the day it will not. Similarly a single dose of 0.002 of quinine may be fatal, but it is harmless in divided doses. The curative dose of 710 is only one-tenth of the fatal dose, but the curative dose of quinine is almost as high as its fatal dose. In other respects, both in the cure and the prevention of the inoculated malaria of canaries, the results of treatment with 710 are practically the same as those obtained with quinine.

W. F.

WARSTADT (A.) & COLLIER (W. A.). Ueber die klinischen Ergebnisse der Behandlung Malariakranker mit den Präparaten "R 118" und "R 123". [Clinical Results of Treatment of Cases of Malaria with "R 118" and "R 123."]—*Ztschr. f. Hyg. u. Infektionskr.* 1931. May 22. Vol. 112. No. 3. pp. 534-543. [Robert Koch Inst. for Infectious Diseases, Berlin.]

The two drugs are slight modifications of a chinolin preparation produced by Dr. A. ROTHMANN and Dr. K. FRICKER of the Chemical Institute of the University of Berlin. The authors conclude that the two preparations are harmless in relatively high doses. They have never observed cyanosis or other complication. The cases treated were chiefly general paralytics inoculated with *P. vivax* and *P. malariae* and some cases of natural infection. They find that the therapeutic action in malaria is relatively slow, but in inoculation malaria, both tertian and quartan, a favourable result was produced. Also in natural infections with these parasites, not only the schizonts but also the gametocytes were destroyed. Further investigations, carried out over a long period and under suitable conditions, will be required before they can express an opinion as to complete sterilization of the organism. Also the most suitable dose will have to be determined. The drugs were administered intramuscularly, subcutaneously and orally.

E. D. W. Greig.

FERRADAS (Manuel G.). La adrenalina como coadyuvante en el tratamiento del paludismo. [Adrenalin as an Auxiliary in the Treatment of Malaria.]—*Medicina Paises Calidos*. Madrid. 1931. May. Vol. 4. No. 3. pp. 243-244.

When engaged on an Anti-malarial Campaign in 1928 the author gave to suspected subjects (those with enlarged spleen, anaemia and debility) a dose of adrenalin in order to detect as many infected as possible and with a view to treating them before the next hatching out

of mosquitoes. Though the results as regards "activation of parasites" were disappointing the patients showed notable improvement in their general condition. Seeing that certain of the symptoms accompanying plasmodium infection—weakness, prostration, low pulse tension, vomiting, anaemia, etc.—may be due to adrenal deficiency, he started giving 20 drops of 1 in 1,000 adrenalin daily 4 hours after the quinine for 10 consecutive days, and, after a 10 days' interval, another course of 8 days. He found that the quinine was more easily tolerated than when given alone, and that headache and vomiting rapidly disappeared and the general state was much improved. The number so treated has been up to the present few, but the author states that of 15 primary cases treated in 1928 only 2 have relapsed up to 1930, whereas 65 per cent. relapsed [total not given] of those treated by quinine alone. Of 22 chronic patients (3 years or more) with anaemia and splenomegaly, only 6 relapsed and in all the cachectic signs cleared up. The adrenalin, he maintains, "enhances the effect of quinine, raises the patients' tolerance and has [general] beneficial effects."

H. H. S.

DILIBERTO (Ugo). Tentativi di terapia medica delle splenomegalie malariche croniche. [**Medicinal Treatment of Chronic Malarial Splenomegaly.**]—*Riv. Sanitaria Siciliana*. 1931. May 15. Vol. 19. No. 10. pp. 711-714, 717. [4 refs.] English summary (5 lines). [General Med. Clinic, Univ., Palermo.]

Details of six patients are recorded. In all the spleen was enlarged to the level of the umbilicus, and each patient had suffered from malaria for several, 4 to 16, years. The author's method was to give adrenalin intravenously, daily or every other day according to the degree of reaction, in doses starting with 0.01 mgm. and increasing gradually to 0.1 mgm. or, rarely, 0.2 mgm. The usual duration of treatment was about 2 months, and some 40 injections were given in each case totalling 3.5 mgm. of adrenalin. In two of the patients the spleens returned to the normal size; in three others there was marked reduction to one half or one third; one failed altogether to respond and the treatment was abandoned after 40 injections had been given (3.5 mgm. in all) in 2 months. Susceptible patients exhibited pallor, headache, tremor, muscular irritability and mental excitability. In all but one there was marked improvement in the anaemia. The red cells increased in one patient from 625,000 to 4,000,000 and the Hb from 40 to 80 per cent., in another from 900,000 to 2,000,000 and Hb 50 to 70 per cent.; those who showed most reduction of spleen also showed greatest improvement in the blood condition.

H. H. S.

SURBEK (K. E.). Zur Frage der Splenektomie bei gewissen Fällen von chronischer Malaria. Dauerresultate. [**Splenectomy in Certain Cases of Chronic Malaria. Lasting Results.**]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1931. Sept. Vol. 35. No. 9. pp. 537-540. [1 ref.] [Central Pagar Alam Hosp., Sumatra.]

The author performed splenectomy in 10 cases of enlarged spleen in chronic malaria. Although parasites were found in only one blood before operation it was assumed that there could be no question of the

splenomegaly in Java and Sumatra being due to any other disease. The operation was done under local anaesthesia. The weight of the spleens removed varied from 250 to 1,250 gm., the ages of the patients from 12 to 29 years; 9 were males and one a female. The operation was undertaken after several weeks' observation, during which the usual combination of quinine and arsenic had proved unsatisfactory. Plasmochin was not available. Apparently the patients failed to recover on account of the large spleen; unfortunately the author was unable to confirm this view by haematological investigations. The permanent after-results were satisfactory. Medical treatment now produced much better results. The anaemic condition improved and the patients lost the pale icteric look. In two cases a slight renal disturbance cleared up.

E. D. W. Greig.

UMANSKY (James). **Treatment of Malarial Coma.**—*Lancet*. 1931. Aug. 15. pp. 349–350. [1 ref.]

The author treated 14 cases of malarial coma at Doshambe, in the subtropical country of Tagykistan. The first 4 died, but the other 10 treated by injections of 3 cc. of a 40 per cent. solution of urotropine, sterilized by boiling, all recovered. The cerebral symptoms passed off in a few hours; the pyrexia and parasites remained, and were dealt with by the usual therapy. He suggests that the formaldehyde derived from the urotropine hinders the adherence of the damaged erythrocytes to the walls of the blood vessels and restores the circulation in the blocked capillaries.

W. F.

BARRAUD (P. J.). **Notes on Some Entomological Technique for the Malariologist.**—*Records of the Malaria Survey of India*. 1931. Mar. Vol. 2. No. 1. pp. 157–160.

1. The transmission of *Anopheles* larvae through the post.

“The following method for sending specimens of larvae through the post has been tested during the past year and the results have proved very satisfactory. A specimen tube $2\frac{1}{2}$ inches \times 1 inch, or 3 inches \times 1 inch, is prepared by pushing a wad of cotton-wool, soaked in formalin, down to the bottom, and this is held firmly in place by a disc of cork. The disc should be about $\frac{1}{4}$ inch thick as, if it be too thin, it will warp and shake loose. The disc may conveniently be cut from the lower end of the cork supplied with the tube, but care must be taken to see that it fits the tube very tightly. The wad of cotton-wool should be about $\frac{1}{2}$ inch thick when firmly pressed down. Sufficient formalin should be used so that when the cork disc is forced down on to the wool it will become saturated with the liquid, any excess being afterwards poured off.

“Larvae are transferred to the tube, from water, either with a spoon or with a wide-mouth pipette; 30 or 40 larvae may be placed in one tube. *All the water* is then poured off, or drawn off with a pipette, leaving the larvae stranded on the cork disc or on the sides of the tube. The open end of the tube is then firmly corked, the tube done up in cotton-wool, or soft paper, and packed in a wooden box. The larvae are very soon killed by the formalin vapour and remain attached to the cork disc, or

the sides of the tube, quite firmly, and there is very little risk of their being shaken about."

2. Rearing *Anopheles* from the egg.

" . . . Gravid female *Anopheles* are selected and confined in lamp globes. For single specimens 'Boy Globes,' 4 inches \times 2½ inches, obtainable in Calcutta, are very suitable; for numbers of specimens ordinary hurricane lamp globes are used. The upper end of the globe is covered with mosquito netting upon which are placed some raisins and a strip of lint, the latter being kept continuously damp. A receptacle containing water is placed inside the lower end of the globe. Some grass stems may be pushed into the globe beforehand to afford resting places for the mosquitoes. The globes should be kept in a dark place free from ants. Should the temperature be very low, the globes may be kept in an incubator at about 20° to 22° C. . . . The gravid mosquito is transferred to a test tube and then allowed to fall from the tube on to the surface of water. Frequently it will commence to lay within a few minutes. If the mosquito be very active, it may be partially stunned by rapping the tube smartly against the hand and the mosquito then allowed to fall on to the water.

"Soon after the eggs have been laid, they are transferred with a camel-hair brush to water in a bowl, basin or dish. The best results have been obtained with glass petri dishes 8 to 10 inches in diameter."

The eggs are floated within a ring of cork, coated with hard paraffin, which prevents the eggs from becoming stranded on the side of the dish.

"Some *Spirogyra* and a plant of grass, with some soil attached to the roots, are added, and, as soon as the larvae hatch, some chopped flies are scattered on the surface of the water. The *Spirogyra* should be kept in a basin for some time previously and exposed to sunshine, search being made from time to time for any eggs, larvae, or other living creatures and these removed. *From now onwards the dishes containing the larvae are kept in the sun, during the early morning hours, or for several hours during the day.* This is the most important part of the technique. The sun causes bubbles of oxygen to form in the *Spirogyra* which keep the water aerated and prevent a scum forming on the surface. The grass plant affords shade and shelter to those larvae which prefer this condition to direct sunlight.

"If convenient, the dishes are examined about midday, when some cool water and more food material are added if necessary. About 4 or 5 p.m. the dishes are put away for the night and are covered with another petri dish, or sheet of glass to prevent other mosquitoes from laying eggs upon the water. It should be mentioned that on no account should the dishes be covered when exposed to sunshine.

"The time occupied in rearing larvae by this method is usually not more than 15 to 30 minutes daily, according to the number of dishes to be handled, and the work can be done by an assistant with occasional supervision."

W. F.

ANAZAWA (K.). **Experimental Studies on the Infectability of Anopheline Mosquitoes of Formosa.**—*Taiwan Igakkai Zasshi (Jl. Med. Assoc. Formosa)*. 1931. June. Vol. 30. No. 6 (315). pp. 609-632. [84 refs.] [In Japanese. English summary pp. 42-45.]

The mosquitoes employed were bred from larvae in the laboratory. They were fed only once on a carrier, and were then kept in cages at an average temperature between 20° and 29° C. The results were as follows:—

1. Result of experimental infection with tertian fever :

Species of Anopheles.	Number of mosquitoes dissected after feeding.	Number of mosquitoes with developed oöcysts.	Number of mosquitoes with developed sporozoites (infected salivary glands).	Total infected.	Percentage of infection.
<i>A. sinensis</i> ...	42	24	8 (2)	25	59.5
<i>A. minimus</i> ...	23	15	5 (1)	15	65.2
<i>A. maculatus</i> ...	11	6	4 (1)	7	63.6
<i>A. tessellatus</i> ...	2	2	—	2	100
<i>A. hatorii</i> ...	13	8	4 (1)	8	61.5
<i>A. fuliginosus</i> ...	16	9	3	9	56.3
<i>A. splendidus</i> ...	7	2	3 (1)	4	57.1
<i>A. pleccau</i> ...	5	4	3	4	80

2. Result of experimental infection with quartan fever :

Species of Anopheles.	Number of mosquitoes dissected after feeding.	Number of mosquitoes with developed oöcysts.	Number of mosquitoes with developed sporozoites (infected salivary glands).	Total infected.	Percentage of infection.
<i>A. sinensis</i> ...	202	34	—	34	16.8
<i>A. minimus</i> ...	93	11	—	11	11.8
<i>A. maculatus</i> ...	28	9	—	9	32.1
<i>A. tessellatus</i> ...	12	6	3 (1)	6	50
<i>A. hatorii</i> ...	26	4	—	4	15.4
<i>A. fuliginosus</i> ...	64	12	3	13	20.3
<i>A. splendidus</i> ...	14	5	—	5	35.7
<i>A. pleccau</i> ...	13	6	1	6	46.2

3. Result of experimental infection with subtertian fever :

Species of Anopheles.	Number of mosquitoes dissected after feeding.	Number of mosquitoes with developed oöcysts.	Number of mosquitoes with developed sporozoites (infected salivary glands).	Total infected.	Percentage of infection.
<i>A. sinensis</i> ...	29	0	0	0	0
<i>A. minimus</i> ...	28	18	3 (2)	18	64.3
<i>A. maculatus</i> ...	23	11	3 (1)	11	47.8
<i>A. tessellatus</i> ...	26	23	10 (3)	23	88.5
<i>A. hatorii</i> ...	31	21	—	21	67.7
<i>A. fuliginosus</i> ...	9	7	3 (1)	8	88.9
<i>A. splendidus</i> ...	15	1	3 (3)	4	26.7
<i>A. pleccau</i> ...	5	5	1 (1)	5	100

SWELLENGREBEL (N. H.) & DE BUCK (A.). **Correlation between Intestinal and Salivary Infection in *Anopheles maculipennis*.**—Reprinted from *Proc. Roy. Acad. Sci. Amsterdam*. 1931. Vol. 34. No. 1. pp. 183–185. With 1 text fig. [Royal Colonial Inst., Amsterdam.]

In 23 batches of *A. maculipennis*, infected with benign tertian malaria, containing an average of 59 in each batch, the mean oöcyst-rate was 45 per cent. and the mean sporozoite rate 47 per cent. "This unambiguous result should remove all doubt as to the accuracy of the oöcyst-rate as a measure to test the suitability of *A. maculipennis* to transmit malaria." The authors maintain that the sporozoite rate is less accurate than the oöcyst rate. They conclude that, in *A. maculipennis*, intestinal infection provides a more accurate estimate of the number of sporozoite carriers than salivary infection, and this probably applies to other species as well.

W. F.

AVERBOUCH (Ida). Expériences sur la transmission à l'homme [de] la fièvre quarte par les piqûres d'*Anopheles maculipennis* var. *sacharovi*. [Experimental Transmission of *P. malariae* to Man by *A. maculipennis* var. *sacharovi*.]—*Rev. Microbiol., Epidémiol. et Parasit.* 1930. Vol. 9. No. 3. pp. 379–381. [4 refs.] [In Russian. French summary.]

Working in Tashkent the author succeeded in infecting *Anopheles maculipennis* var. *sacharovi* from a case of quartan malaria and in transmitting the infection to another human being. The experiments were conducted in the winter of 1928–1929. The mosquitoes were collected in their hibernating quarters and kept in glasses covered with muslin. The patient on which the mosquitoes were fed had the first attack in October, 1928; when first examined ten days later, *P. malariae* was found in the blood. He was given injections of 50 per cent. solution "chinopyrini" (?) in doses of 2 cc. until the symptoms disappeared. About a month later there was a relapse and treatment was resumed, but failed to stop the attacks. In the middle of December, when the patient still showed a fair number of parasites, the author allowed 96 *A. maculipennis* var. *sacharovi* to feed on herself. From the 14th day onwards zygotes were found in some of the mosquitoes, but no sporozoites. On the 26th day only three mosquitoes remained alive, and these were allowed to feed on the author. A month later she had the first attack. Parasites (*P. malariae*) were recovered during the third attack. About a fortnight later gametes appeared in the blood. During the whole of this period the patient remained without treatment. The author notes that at the time of infection she was undergoing a course of antirabic inoculations and believes that these may have played a provocative rôle in the development of the malarial symptoms.

C. A. Hoare.

STRICKLAND (C.) & ROY (D. N.). **The Value of the " Sergeants' Method " for detecting Malarial Infection in Mosquitoes.**—*Indian Med. Gaz.* 1931. July. Vol. 66. No. 7. pp. 388–390. With 2 text figs. [5 refs.]

The authors have followed the technique recommended to them by Dr. Edmond SERGENT, with slight modifications. After pulling off

the legs and wings, the mosquito is placed on a slide and decapitated with a sharp-edged needle. The thorax is then pressed gently with a blunt needle so that some body-fluid exudes from the cut end into a minute drop of salt-solution. The S-shaped or sickle-shaped sporozoites, which are about 14μ long, can be found with the $1/6$ objective. The authors always found sporozoites by this method when they were present in the salivary glands, and if there were none in the body-fluid, there were none in the salivary gland. This method is far quicker and far more simple than dissecting out the gland.

W. F.

CARLEY (Paul S.). **Results of the Dissection of 1,017 Wild-Caught Anophelines in Jamaica.**—*Amer. Jl. Trop. Med.* 1931. July. Vol. 11. No. 4. pp. 293-296. With 1 text fig. [1 ref.]

As the result of the dissection of 1,017 wild Jamaican anopheles, two specimens of *A. albimanus* were found infected, one in the stomach and one in the salivary glands. One specimen of *A. grabhami* contained a single oöcyst.

W. F.

MESNARD (J.) & MORIN (H.). Réceptivité naturelle de *Anopheles (Myzomyia) aconitus* à l'infection par l'hématozoaire du paludisme en Cochinchine. [**Natural Infection of *A. aconitus* in Cochin China.**]—*Bull. Soc. Path. Exot.* 1931. July 8. Vol. 24. No. 7. pp. 554-556.

The authors have found that in Cochin China *A. aconitus* is infected to the same degree as *A. minimus*; the latter anopheline is however far more numerous.

W. F.

KNOWLES (R.). **The Laboratory Diagnosis of Malaria.**—*Indian Med. Gaz.* 1931. May. Vol. 66. No. 5. pp. 271-278. With 3 text figs. [12 refs.]

This is an address to the Calcutta Branch of the B.M.A. Colonel Knowles always examines both thick and thin films in every case. In examining thin films he uses a $1/7$ th inch fluorite immersion lens, switching over to the $1/12$ th inch when necessary. The following method is used for thick films.

Flood the slide with this mixture: Glacial Acetic 2.5 per cent. in distilled water, 4 parts; Crystal Tartaric Acid 2 per cent. in distilled water, 1 part.

This dehaemoglobinizes the film which becomes grey white.

When dehaemoglobinization is complete, pour off the fluid and flood with methyl alcohol, for 5 minutes.

Drain off the methyl alcohol and wash very thoroughly with neutral or slightly alkaline distilled water.

Stain with Giemsa.

The distilled water must be neutral or faintly alkaline. To ensure this, put 5 cc. in a test tube and add 5 drops of a 0.04 per cent. watery solution of bromo-cresol purple. If the water is acid it will turn pale yellow. If it does so, add a 1 in 1,000 solution of sodium carbonate, drop by drop, until the water just turns violet, which indicates that it has become faintly alkaline. Methyl alcohol rapidly loses its fixative power in the tropics. It should be put up in sealed 5 cc. phials, and should be specified as "*purissimum*, free from acetone."

Bass's blood culture method has been employed for the last two years, in Calcutta, as a routine method of diagnosis, and it detects infections in which the parasites are too scanty to be found in films. The following technique is employed.

Five cc. of blood, drawn off with a sterile, perfectly dry syringe, are put into an Ehrlenmeyer flask containing 20-30 glass beads, and are defibrinated by gentle rotation of the flask on the laboratory bench. Care must be taken not to form bubbles. A 50 per cent. solution of Merck's dextrose *purissimum* is sterilized by steaming for half an hour on each of three successive days. One drop of this solution is put into each of a number of small test tubes measuring $12\frac{1}{2}$ by $1\frac{1}{2}$ cm. The defibrinated blood is pipetted into these tubes, so as to form a column about $2\frac{1}{2}$ cm. deep in each. The upper parts of the tubes are warmed and, while they are still warm, rubber teats are fitted over their mouths to insure partial anaerobiosis. They are incubated at 37° C. and examined after 12, 24, and 48 hours (see this *Bulletin*, 1930, Vol. 27, p. 198, and Vol. 10, p. 169).

W. F.

SIEBURGH (G.). De kleuring van malaria parasieten volgens Leishman-Shute. [**The Malaria Parasite Staining Method of Leishman-Shute.**]—*Geneesk. Tijdschr. v. Nederl.-Indië*. 1931. Aug. 15. Vol. 71. No. 10. pp. 904-909. [26 refs.] [Med. Lab., Batavia.]

Extending the staining period from 30 to 45 minutes Sieburgh otherwise exactly followed SHUTE's technic (see this *Bulletin*, Vol. 27, p. 663). He could show neither the quartan stippling in younger stages of the quartan parasite, nor Schüffner's dots in the youngest stages of tertian parasites. Maurer's spots in subtertian were regularly found. This failure, which possibly may be ascribed to influences of the tropical climate on the staining procedure, does away with the practical advantage of SHUTE's method, i.e., the easier identification of the younger stages of the parasites.

W. J. Bais.

GARNHAM (P. C. C.). **The Staining of Malaria Parasites.**—*Kenya & East African Med. Jl.* 1931. May. Vol. 8. No. 2. pp. 56-57.

It is difficult to distinguish subtertian from quartan rings. The difficulty can be overcome by using a stain which demonstrates Maurer's spots in the former. Acidity of the slides, which interferes with correct staining, can be avoided by treating them with a saturated solution of sodium silicate, washing and drying. To demonstrate Maurer's spots, the following stain is recommended :—

Eosin methylene blue	...	...	...	...	0.32 gram.
Eosin methylene violet	...	...	...	...	0.16 gram.
Methyl alcohol (acetone free)	...	...	...	...	100.00 cc.

Leave the stain in a bottle for 3 days after mixing and then filter. To use, fix a thin film with 2 or 3 drops of the stain for not longer than 5 seconds; add 10 times the quantity of distilled water; leave for $\frac{1}{2}$ hour; flush with distilled water; dry and examine. Leucocytes and crescents are grossly overstained and the slide is covered with a light deposit, but infected cells are clearly shown.

W. F.

BRINKMANN (Ernst). Schneller Nachweis der Malaria plasmodien. [**Method for Rapid Detection of Malarial Plasmodia.**]—*Med. Klin.* 1931. May 1. Vol. 27. p. 661.

This procedure is practically the same as the ordinary method of vital staining for reticulocytes. A 2 per cent. alcoholic solution of brilliant cresol blue is allowed to dry on a slide forming a patch about the size of a shilling. A small drop of blood is applied to the middle of the patch and

covered with a cover glass; the blood should not spread out quite to the edge of the cover. The author recommends practice with typical cases of malaria to familiarize the appearances of the parasite with the new method. He claims that it is extremely simple and rapid, allowing the examination of a comparatively thick drop of blood. Positive results are more frequently and earlier obtained than by other methods. The disadvantage is that permanent preparations cannot be made.

E. D. W. Greig.

ROCCHI (Filippo). Intradermoreazioni e anticorpi verso il pigmento malarico. (**Intradermic Reactions and Elaboration of Antibodies against Malarial Black Pigment.**)—*Riv. di Malariologia*. 1931. Mar.-Apr. Vol. 10. No. 2. pp. 161-182. [13 refs.] English summary p. 266. [Inst. of Path. Anat., Univ., Rome.]

It would require a very full abstract, almost a translation, to deal adequately with the points brought forward in this article and those who have been studying and working at serological reactions in malaria should consult the original. The author enumerates the various attempts which have been made to find a satisfactory antigen for complement fixation tests in malaria and discusses in greater detail HENRY's ferro- and melanoflocculation. He then states that his aim was to find out if there was not in a malaria subject some antibody to melanin, using malaria pigment itself as antigen; his test differs therefore from Henry's in the employment of malaria pigment instead of choroidal pigment or a proteinate of Fe. It differs also in not being an extracorporeal but an intradermal reaction. From it one infers that malarial pigment is not an inert substance, but acts as an endoantigen.

The author describes in detail his technique for obtaining the pigment and for the test suspends it in a fluid which he found after many trials gave no skin reaction by itself, namely, saturated solution of lithium carbonate 1.3 parts, physiological saline 10 parts. The amount injected is 0.5 cc. He expected to find a positive result in malarial subjects and negative in non-malarious controls, and to his surprise the reverse occurred. The size of the wheal may be 55 x 30 mm., but the average was 30 x 25 mm., beginning to show itself not at once but after 4-5 hours, lasting for 15 or, occasionally, 48 hours.

The test was carried out on 105 malarious subjects, subdivided into groups: 1. Primary cases of benign tertian (23); 2. Relapsed cases of benign tertian (30); 3. Primary malignant tertian (24); 4. Relapsed m.t. (17); 5. Quartan, 2 primary and one relapsed; 6. Chronic malaria (8); also of three general paralytics inoculated with b.t. and of 15 persons healthy or suffering from non-malarial disease but cured many years before of malaria. For controls he tested 109 persons, either healthy or suffering from disease other than malaria and giving no history of any malaria in the past.

Here only an epitome of the results can be given which are more fully described in the article. Of the 105 with malaria actually present 80 were negative (76 per cent.); of the 15 with old cured malaria 14 were positive; of the 109 controls 90 were positive (82.5 per cent.); lastly, the general paralytics gave a positive before being inoculated with *P. vivax*, negative after and during the time of febrile attacks, returning again to positive 40-60 days later. The test would seem, therefore, to bear an analogy with the Schick test for diphtheria. The pigment, in short, provokes a local reaction in a great majority of non-malarious subjects and those who have been cured of the disease,

but leads to no response in those actually suffering from it. As a final test the author took blood from a patient with numerous parasites and from a healthy individual, filtered them separately (to remove all parasites from the former) and diluted the sera equally; he then injected intradermically two non-malarious subjects with 2 cc. [sic] of each in corresponding situations. The local swellings produced subsided in 2-3 days and on the fifth day he injected the pigment solution into one zone and haemoglobin solution into the other. [This was done in all the tests, but has been omitted from the above description in order not to complicate matters; the reaction to Hb was a weak positive in practically every case.] By way of control these two solutions were injected into another individual whose skin had not been previously treated. The latter gave + + +; the normal serum areas on the first two gave a + + to the injected pigment, the "malaria serum" areas a negative, thus demonstrating the passive transmission of local skin immunity from a malarious to a non-malarious subject. Five days later this local reaction became lost.

H. H. S.

BROTZU (G.). Valeur des réactions floculantes dans la diagnose de la malaria. [**The Value of Flocculation Reactions in the Diagnosis of Malaria.**—*Boll. Sezione Ital., Soc. Internaz. di Microbiologia.* Milan. 1931. July-Aug. Vol. 3. No. 7-8. pp. 429-433.

—, Valore delle reazioni floculanti nella diagnosi di malaria.—*Atti III. Congresso Naz. di Microbiol., Milano, 1931.* pp. 77-81.

There are two malaria pigments, namely melanin and an ochreous pigment which is rich in iron. HENRY (*ante*, p. 139) could not obtain these pigments from the human body in sufficient quantity to serve as antigens in his reactions, and consequently he substituted choroidal pigment for the first, and methylarsinate and albuminate of iron for the second. The author employs yet another antigen, namely sepia, diluted until it is brown and limpid. In 32 cases where the choroidal pigment gave a positive reaction, the sepia was positive in 28. He considers the choroidal antigen too sensitive. His conclusions are as follows:

The reaction appears quickly in the first attack of malaria. It is sometimes negative during the fever. It may be positive in persons not having attacks, whether there are parasites in their blood or not. The reaction remains positive for a certain time during the cure and, in some cases, even after. The reactions with choroid pigment and with sepia are more sensitive than the reactions with iron salts. In thirteen controls, suffering from diseases other than malaria, there were no positive reactions.

W. F.

LAVERGNE (J.) & MONIER (H.). Utilisation de la sérofloculation de Henry dans le diagnostic et le traitement du paludisme. [**Henry's Reaction in the Diagnosis and Treatment of Malaria.**—*Bull. Soc. Path. Exot.* 1931. July 8. Vol. 24. No. 7. pp. 539-544. [1 ref.]

In 16 cases with fever and parasites, the reaction was positive in only 10. In 2 cases where malarial infection was unlikely, there were strong positive reactions. In 36 cases of probable latent malaria, there

were 22 positive reactions. In 49 cases with no symptoms or history of malaria, the reaction was negative in all. The author concludes that the reaction is clearly specific, but that it would be more accurate if readings were taken with a photometer rather than with the naked eye. Some patients give a much stronger reaction than others, independently of their condition and of the kind of parasite with which they are infected. Many of the cases were examined for leprosy by means of the sedimentation test for leprosy with formalized sheep cells, and, in four cases where the Henry reaction was very strongly positive, there was an exceptional quantity of agglutinins for sheep's corpuscles which disappeared when the Henry reaction became negative.

W. F.

HENRY (F. X.). Malaria-flocculation; les antigènes; l'observation macroscopique des résultats. [**Malaria Flocculation: Antigens: Reading of Results.**].—*C.R. Soc. Biol.* 1931. Sept. 18. Vol. 107. No. 26. pp. 1520-1522. [1 ref.]

The author deals with certain technical points and modifications in connexion with his reactions. When métharfer gives a positive reaction the melanin reaction is positive too; in consequence, he has abandoned the former, and uses only one iron salt—an albuminate of iron No. 113, specially prepared by Merck. For routine diagnosis, he considers it sufficient to use melanin as the only antigen. The tubes are kept in the incubator for $2\frac{1}{2}$ hours; the albuminate tubes are read at once, and the melanin tubes after $\frac{1}{2}$ an hour at room temperature. The precipitate in the albuminate tubes is finer and more granular than that in the melanin tubes. He insists upon the importance of reversing the tubes gently, twice, before reading the results, in order to distinguish flocculation from simple deposition. The results can be read with the naked eye, if the tube is held at an angle before a lamp placed slightly above the level of the observer's eyes. In order to bring the melanin antigen to suitable strength, it should be diluted until its turbidity matches that of 0.20 gram of albumin per litre. Acid-distilled water must be avoided. The water should be doubly distilled in the presence of glass beads.

W. F.

Row (R.). **Precipitin Reaction in Malarial Sera.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1931. Apr. 25. Vol. 24. No. 6. pp. 623-627. With 1 plate. [8 refs.] [Grant Med. College, Bombay.]

Cultures of malaria parasites are used as antigen. First the supernatant serum is removed and the deposit, consisting of merozoites and corpuscles, is washed three times with salt solution. It is then laked in distilled water and centrifuged at high speed. The resulting woolly deposit is dried at 37°C . and rubbed up with 20 times its volume of normal saline: this is the antigen. The test is carried out in tubes of 0.5 cm. bore. A column of the test serum is put into a tube, and an equal quantity of antigen is carefully floated on to the top of it, without mixing. In positive cases, a ring of opalescence appears, after 3 or 4 hours incubation at 37°C ., which deepens after 18 hours at room temperature. The reaction is chiefly a group reaction; the phenomenon is common to sera of *P. vivax* and *P. falciparum* infections with the antigen derived from the cultures of either parasite, but the

reaction between a given serum and its homologous antigen is the more intense. Antigens made from normal blood cells, or from cultures of other protozoa, do not give reactions with malarious blood, nor does the malaria antigen react with sera from cases of syphilis, anaemia and other diseases. The reaction is strongest during the apyrexia after a paroxysm; it diminishes as time goes on until it completely disappears.

W. F.

SINTON (J. A.) & KEHAR (N. D.). **Changes in the Amount of Blood Sugar in Malaria.**—*Records of the Malaria Survey of India.* 1931. June. Vol. 2. No. 2. pp. 287-304. With 4 text figs. [39 refs.]

In 55 cases of benign tertian the blood sugar averaged 0.067 before the fever, 0.124 during the fever and 0.075 after the fever. In two cases of subtertian, the blood sugar rose to 0.206, during pyrexia, in one; and to 0.140 in the other. [See GREEN, this *Bulletin*, Vol. 27, p. 194.] The authors conclude that the rise is due to increased glycogenolysis similar to that which occurs in protein shock and that activity of the adrenals is responsible.

W. F.

JOHNS (F. M.). **Influence of Dextrose and of Low Temperatures on Preservation, Transportation and Viability of Malaria Parasites.**—*Proc. Soc. Experim. Biol. & Med.* 1931. Apr. Vol. 28. No. 7. pp. 743-745. [1 ref.] [Med. School, Tulane Univ. of Louisiana, New Orleans.]

Experiments were made with defibrinated blood from patients who had been inoculated with malaria. Concentrations of dextrose ranging from 0.5 to 2 per cent. were employed, and the blood was kept at temperatures ranging from -5° to $+15^{\circ}$ C. The parasites survived longest in blood containing 1 per cent. of dextrose, and kept at 0° C. The routine method adopted is: run the blood from the collecting syringe into a tube marked for 10 cc., containing 0.2 cc. of a 50 per cent. solution of dextrose. Defibrinate by stirring for 10 minutes with a roughened glass rod. Transfer to rubber-stoppered vaccine bottles of 5 cc. capacity and store in crushed ice. For transportation, pack in a thermos flask filled with ice and water.

The author concludes that "the infectivity of such blood up to 8 days is fully equal to direct transfer of blood from patient to patient." In two cases inoculated with blood 16-18 days old, one was infected, the other was not.

W. F.

AKASHI (Kazuyoshi). Ueber den Kochsalz-Gehalt des Blutes bei Malaria. [**Salt Content of the Blood in Malaria.**]—*Taiwan Igakkai Zasshi (Jl. Med. Assoc. Formosa).* 1931. May. Vol. 30. No. 5. [In Japanese. German summary p. 36.] [Govt. Hosp., Tainan, Formosa.]

The salt content of the blood in 15 healthy men and the same number of females was determined. The content of the blood serum and corpuscles was the same in both, but the salt content of the whole blood was much higher in females than in males, which the author attributes to the fact that the volume of corpuscles is smaller in women than in men. He then investigated 7 cases of malignant tertian, 6 cases of benign tertian and 2 cases of inoculated malaria. In all cases he found that the blood serum, corpuscles and whole blood showed a lowered salt content, but after treatment with quinine the content returned to normal. Reduction of salt content of the blood was not confined to malaria but occurred also in other febrile diseases.

E. D. W. Greig.

SINGH (Jamiat). **Urobilinuria and its Importance in Malaria.**—*Indian Med. Gaz.* 1931. May. Vol. 66. No. 5. pp. 241–244. [2 refs.] [King Edward Med. College, Lahore.]

This is an additional report on the author's investigations (see above, p. 141). Bilirubin is made from haemoglobin by the cells of the reticulo-endothelial system. The bilirubin is converted into stercobilin by micro-organisms in the large intestine. Some of the stercobilin is re-absorbed into the circulation and carried to the liver. If there is more stercobilin than can be dealt with there, some of it passes out through the kidneys as urobilinogen. In health, there is very little urobilinogen in the urine. Excess may be due to excessive blood destruction, in malaria and pernicious anaemia for example, or to the absorption of blood products from collections of blood within the body, such as cerebral haemorrhages or resolving lobar pneumonia. A strongly positive urobilin test with 8,000 to 30,000 units per 100 cc. of urine affords strong presumptive evidence of malaria. There is often a weak positive reaction—a pink colour—in lobar pneumonia, the urobilin units ranging from 4,000 to 8,000 in 100 cc. For quantitative estimation take 10 cc. of urine, add one drop of Lugol's iodine solution and 10 cc. of saturated zinc acetate in absolute alcohol; filter and compare with a standard solution of 1 mgm. of acriflavine in 30,000 cc. of distilled water, representing 1 unit (equivalent to 1 mgm. of urobilin dissolved in 950 cc. of the standard diluent). The comparison should be made in a Cole's comparator.

W. F.

PAWAN (J. L.). **Feulgen Nucleal Reaction and the Malarial Nucleus.**—*Ann. Trop. Med. & Parasit.* 1931. Aug. 13. Vol. 25. No. 2. pp. 185–187. [8 refs.]

The author summarizes his investigation as follows :—

"The modification of the Feulgen Nucleal reaction* applied here indicates :—

"1. That thymonucleic acid is absent in the composition of the nucleus of certain forms of human plasmodia.

"2. That the nuclei of these forms of plasmodia differ chemically from the nuclei of the protozoa studied by Robertson, viz., *Trypanosoma raiae*, *Bodo caudatus* and *Heteromita*."

W. F.

CLYDE (D.). **Report on the Control of Malaria during the Sarda Canal Construction (1920–1929).**—*Records of the Malaria Survey of India.* 1931. Mar. Vol. 2. No. 1. pp. 49–110. With 6 graphs, 1 map & 13 figs. on 8 plates. [2 refs.]

The Sarda Canal scheme will irrigate the districts of Carcilly, Shahjehanpur and Pilibhit as well as Oudh. The canal system is 4,000 miles long and is thus the largest in the world; it waters seven million acres of land, an area equal to more than a fifth of the whole of England. A rise in malaria, similar to that which followed the

* The Feulgen microchemical nucleal reaction is applied to the study of nuclear structure and in particular, nuclear chromatin. In a protozoal nucleus two groups of nucleic acid have been described, of which one is thymonucleic acid. The Feulgen reaction is indicative of the presence of nucleoprotein in the form of thymonucleic acid.

opening of the Ganges canal in 1854, has been guarded against by providing drainage cuts and prohibiting irrigation in all areas where the subsoil water is already high, and 1,800 miles of drainage canals have been laid down. This report deals mainly with the work carried out at the head works of the canal in the notorious Terai, where the spleen rate averages 75 per cent. The labour was imported by contractors, and the coolies were not under official control. The bad name of the district made it difficult to get them, and if they were pricked for blood examination, or were urged too strongly to take quinine, they absconded and there was trouble with the contractors. Construction work was suspended every year in May, at the beginning of the rains, and commenced again in November. During the intervals, the anti-malaria drains were washed away by the floods and the wreckage was buried in the undergrowth and weeds which sprang up. The coolies lived in grass huts and slept on the floor. Their diet was deficient in quality and also in the quantity of fats. Screening was not carried out; without electricity and fans, screened houses in the United Provinces' Terai would be unbearable. Mosquito nets were used only by the more educated officers. The value of mosquito-proofed barracks for uneducated native labour is problematical; the author believes that with regular fumigation and efficient inspection, properly proofed barracks would have been better than grass huts. *Anopheles* bred everywhere and they included practically every species known in the United Provinces. It is interesting that there were no culicines when the work was begun, though a few appeared when the jungle was felled and the camps built. The autumn malaria was probably due to *A. listoni* and the spring malaria due to *A. maculatus* and *A. culicifacies*. It is surprising that in the many thousands of wild *anopheles* examined no oöcysts or sporozoites were discovered.

Owing to the difficulties encountered, almost all the known direct and indirect anti-malaria measures were undertaken at one time or another. Elephant-grass jungle had to be cleared even after Paris green was used, not only to destroy the adult mosquitoes in it, but because the swamps under it were breeding profusely. This clearing provided suitable conditions for open breeders and in some places anophelines appeared where none had been before. Much draining was done, and oiling was carried out from 1921 to 1926 when Paris green was substituted. After 1926, efforts were concentrated upon Paris green dusting and fumigation in conjunction with treatment. The powder had no bad effect upon the larvivorous fish with which the area abounds. "It is extremely doubtful, in the United Provinces Terai at least, if larvicidal fish can be considered as of any use whatever." The following was used for fumigation of labourers' huts, out-houses, etc.—equal parts of sulphur and powdered waste tobacco leaves and stems; half a pound burnt quickly per 1,000 feet of space. For the houses of officials a spray was used composed of carbon tetrachloride 1 per cent. and creosote 2 per cent. in kerosene. In the first years of the works, before anti-malaria measures were started, work had to be abandoned because 96 per cent. of the labour was down with malaria and the contractors refused to continue. All that is now claimed is that, as the result of the measures which were taken, malaria was controlled to such an extent that it became possible to begin again and to carry on the work to completion.

NORRIS (Benjamin). **Malarial Control at Fort Stotsenburg.**—*Milit. Surgeon*. 1931. Apr. Vol. 68. No. 4. pp. 455-464.

Colonel CRAIG referred to Stotsenburg, in 1905, as "the malarial pest-hole of the army." Since 1925 a more vigorous anti-mosquito campaign has been carried on, and since 1928 carriers have been sought out and treated. The results are as follows:—471 cases of malaria in 1923; 415 in 1924; 232 in 1925; 136 in 1926; 141 in 1927; 140 in 1928; 46 in 1929; 10 in first half of 1930.

Drainage, oiling and dusting with Paris green are the antilarval methods adopted. Barracks and stores are sprayed with kerosene, and adult mosquitoes are killed. Soldiers are required to sleep under mosquito nets. Malaria patients are not discharged from hospital until their blood is free from parasites, and afterwards they have to visit the hospital daily for a three-months' course of quinine. Men on duty outside the controlled area are given prophylactic quinine. When a married soldier is admitted, his family is visited and, if necessary, treated. Plasmoquine has been in use since the end of 1928; a fourteen day course is administered to all carriers. The anti-mosquito work is carried out by nine civilian labourers and 22 soldiers. There is an annual anti-malaria fund of \$2,500.

W. F.

i. LE PRINCE (J. A.). **Cost of Malaria Control.**—*Amer. Jl. Public Health*. 1931. Apr. Vol. 21. No. 4. pp. 378-381.

ii. FULLERTON (Howard R.). **Screening and Mosquito Proofing as Elements in Malaria Control.**—*Ibid.* pp. 382-389. [Tennessee State Dept. of Public Health, Nashville, Tenn.]

i. The cost of antilarval measures in 70 towns in ten southern states was between 70 and 80 cents a head for the first year and from 20 to 30 cents afterwards. This included ditching and larvicides. In the tropics, where mosquitoes are present all the year round the cost is higher; in Panama, it was one cent a day for each person, or \$3.65 in the year, exclusive of screening.

Millions of dollars are being spent in the southern states for the prevention of malaria by the great hydro-electric power-companies. Some of the lakes impounded for these purposes are hundreds of miles in circumference. Paris green will make the work cheaper; but unfortunately it does not destroy culicines. During 1927, the Red Cross and the U.S. Public Health Service screened about 8,000 "farmer-tenant homes" in the Mississippi River area at an average cost of \$10 a house. The screening lasts about 5 years.

ii. "The local health departments do not do malaria control work exclusively, but carry it along as one of their major activities in their general health work." Screening alone does not make a Tennessee labourer's house mosquito-proof, because there are so many holes in the floor and the walls. This difficulty has been overcome by employing the tough heavy paper which is used for wrapping up tea samples. Many tons of this paper was obtained without charge from a cotton exchange. In 1928, the landowners and county officials of Lake County formed an anti-malaria committee. They provided a small capital, obtained a factory free of charge, and started to manufacture screen-doors and windows, with the result that 90 per cent. of the county has

been screened. In Gibson County a meeting of dealers was held and \$2.25 agreed upon as the price of a screened door, only 16 mesh wire to be used.

W. F.

WALCH (E. W.), VAN BREEMEN (M. L.) & REYNTJES (E. J.). **The Sanitation of the Saltwater Fishponds of Batavia (a Contribution towards the "Hygienic" Exploitation of the Bandeng-Ponds).**—*Meded. Dienst d. Volksgezondheid in Nederl.-Indië.* 1930. Vol. 19. Pt. 3. pp. 400-430. With 4 figs. & 8 plates. [Refs. in footnotes.]

The work described in this paper illustrates the value of a special Technical Sanitary Department of the Medical and Sanitary Service. It also illustrates the value of co-operation between the various branches of a Government Service. Here all helped: the fisheries department, the war department (with photographs from the air), the agricultural, the museums, etc. The article deals with the application of the Pasoeran method of exploitation to the fish-ponds of Batavia. (See DE VOGEL above, p. 110, and Walch and SCHUURMAN, 1930, Vol. 27, p. 640.) The results were most satisfactory. Within a few months the flora of the ponds was changed, and anopheles were banished although they continued to breed in the untreated fishponds alongside. This was accomplished without injury to the fish breeding industry. The authors encountered much opposition from the fish breeders and are to be congratulated on the determination, energy and tact with which they carried through their work to the satisfaction of all concerned.

W. F.

MALAYAN MEDICAL JOURNAL. 1930. Sept. Vol. 5. No. 3. pp. 108-109.—**Silt-Pitting on Rubber Estates in Relation to Mosquito Breeding and Malaria.**

To stop surface wash of water and erosion on undulating or hilly land during or after heavy rainfall and to assist natural percolation through the soil, contour drains are made; preferably by banking the soil, with or without silt pits. In heavy soil (impermeable or semi-impermeable) the contour drains should run to a common outlet, the discharge being through stops which allow the water to trickle away and prevent sudden rushes; rubble, brushwood, etc., may be employed in construction. Drainage systems on this principle for such special cases have already been reported as functioning successfully in Malaya.

Since silt-pitting became a widespread practice in agricultural land in the Malaya Peninsula, the larvae of dangerous anopheles, notably *Anopheles maculatus*, have been found by many observers and on many occasions in water standing in silt-pits on hillsides and on relatively flat land. The tendency for *A. maculatus* to breed in such pits undoubtedly becomes greater where other natural waters are regularly and efficiently oiled.

Since silt pits or drains are necessary in old rubber plantations, measures should be adopted within forty chains of dwellings for the prevention of anopheline mosquito breeding. Such possible measures are:—(a) Measures to prevent retention of excess water. Although pits are used to conserve water in most cases, other cases require removal by drainage. (b) The use of larvicides. The easiest method, the report states, is to apply fuel oil with a very small mop, and this

need be done only once a fortnight if the water be stagnant. Such oiling of all waters retained in pits in a residential area is being performed at present by a number of estates as part of the regular anti-malarial work. (c) In flat lands trenches should be continuous without stops. In residential areas it is recommended that contour drains be made by banking with surface soil. Such systems should always be adopted in the anti-malarial areas in new clearings, in place of pitting or digging trenches, unless such special soil conditions exist as would make pitting indispensable.

H. Home.

BENNETT (H. Leigh). **Anti-Malarial Drainage.**—*Kenya & East African Med. Jl.* 1930. Oct. Vol. 7. No. 7. pp. 190–198.

In discussing the question of swamp drainage the author points out the value of contour drains to cut off seepage. In a drainage system it is in certain cases necessary, to prevent anopheline breeding, to arrange to dry out a part of the drainage in rotation by shutting off a section and discharging through the remaining drainage. Earth channels are difficult to maintain in shape and grade and for any permanent anti-malarial work a stone, brick, or concrete invert and bottom section is necessary. Especially is this the case where the discharge from dwellings is taken. The sides of the channel should be sloped and firmly turfed and storm water can then be discharged without erosion following.

Subsoil drainage is often of value not only for the drainage of valley bottoms, etc., but also for flat areas to be occupied by dwellings. The author instances the case of a site at Kuala Lumpur, which had been turned down as too water-logged for even a night-soil dump, was drained by this method and is now a flourishing settlement. In the case of the type of swamp in which there is no natural discharge because of the land contours and of which the bottom is sealed by an impermeable stratum, successful work has been carried out through vertical drainage. A well is sunk through the impermeable stratum to lower permeable beds and from this well radial arms of subsoil piping should be laid at say 3 foot depth. The well coping should be carried up about 2 feet above ground level to cut off silt which may be washed in by storm water. The value of tree planting for the drying-out of swamp areas should not be overlooked. *Eucalyptus (robusta and soligna)* transpire very heavily and have the effect of drying-out large swamps.

The author mentions several farms in Eldoret and Kitale districts on which there are swamps that the owners are not attempting to cultivate because of the expense of drainage. These swamps could easily be dried out completely in about five years by planting trees, the cost of which would not exceed £3 per acre.

H. Home.

BARROWMAN (Barclay). **Anti-Malarial Oils and their Specification.**—*Malayan Med. Jl.* 1931. Mar. Vol. 6. No. 1. pp. 7–11. With 7 charts in text.

Five rubber estates used an oil composed of kerosene, solar oil and crude oil, which was purchased already mixed. In 1928 there were many cases of malaria, and the larvae of *A. maculatus* were found living in the water which had been oiled with this stock mixture. Adjoining

estates which prepared their own oil mixtures did not suffer in the same way, and when the five estates in question followed their example, mosquito breeding was checked and the monthly incidence of malaria fell from 3.3 to 0.2 per cent. A mixture composed of kerosene 4 parts, solar oil 20 parts, and crude oil 40 parts was found the most efficient. The value of an oil is usually estimated by its power to kill mosquito larvae when it is added to water containing them. But in practice, the most toxic oil is not always the most successful in controlling malaria; its spreading and lasting qualities must be taken into account, for the main purpose of an anti-mosquito oil is to make the water repulsive to the adult insects and so prevent their laying their eggs in it.

W. F.

BOSE (K.). **Application and Use of Larvicides.**—*Indian Med. Gaz.* 1931. Aug. Vol. 66. No. 8. pp. 436-440. With 2 text figs. [3 refs.]

The Birnagar Palli Mandali (see this *Bulletin*, Vol. 26, p. 909) has now adopted the use of Paris green, distributed by means of American rotary blowers, as an antilarval measure. Brick dust from old ruins is a satisfactory diluent. Where it formerly took a gang of men 8 days to complete a round of spraying with oil, it is now possible to "green" the whole area in 2½ hours. Moreover, no clearing of weeds is necessary when Paris green is used, and this is a great saving. "Wider use of this larvicide has hitherto been hampered mainly for lack of information in India about the suitable type of blowers." [This has been remedied by the publication of Major COVELL's book, see below, p. 1035.]

W. F.

BOGOPOLSKY (M.). **[Prophylactic Quinization of Chronic Malaria Cases.]**—*Trop. Med. & Vet.* Moscow. 1930. Vol. 8. No. 6-7. pp. 11-13. [In Russian.]

Systematic prophylactic administration of quinine for chronic cases of malaria has been carried out in Kiev, at the Regional Malaria Station from 1925 to 1927. The course was as follows: from January to July, 0.5 gm. quinine hydrochloride every 7th and 8th days (= 20 gm. in 6 months); from July onwards—the same dose once a week. The results appeared to be satisfactory; in 1925 no relapses were observed, while in 1926 out of 771 cases, 34 (4.4 p.c.) relapsed; in 1927 there were 19 (3.3 p.c.) relapses among the 572 chronic cases treated.

C. A. Hoare.

JAMES (J. F.). **Quinine Prophylaxis and Other Notes on Malaria.**—*Indian Med. Gaz.* 1931. Aug. Vol. 66. No. 8. pp. 440-443. With 2 text figs. [Indian Military Hosp., Nowshera.]

This paper deals with the administrative side of prophylaxis with quinine among soldiers. In a series of 6,000 men to whom quinine was given, two cases of quinine idiosyncrasy occurred. The Boerner skin reaction was positive with quinine in both cases. The symptoms were, puffiness of the face, erythema, vomiting, diarrhoea, itching and urticaria. An injection of adrenalin gave relief in a few minutes. Both patients could take quinidine or plasmoquine with impunity.

W. F.

GOSIO (Renato). Contributo clinico allo studio delle gravi anemie insorgenti nelle malariche in gravidanza. (*Clinical Contribution to the Study of the Severe Malarial Anaemias in Pregnancy.*)—*Riv. di Malarologia*. 1931. Jan.-Feb. Vol. 10. No. 1. pp. 52-85. With 6 text figs. [16 refs.] English summary p. 158. [Roy. Inst. of Clin. Med., Univ., Rome.]

This paper is based upon a study of 15 patients. Seven of these cases in which the degree of anaemia was severe are fully detailed [but in five of them parasites could not be found].

H. H. S.

ONNIZEW (P.). Untersuchung der Retraktion des Blutkoagulums bei Malariakranken. [*Retraction of the Blood Clot in Malaria.*]—*Odessaer Med. Ztschr.* 1930. Vol. 5. No. 3-5. pp. 255-257. [9 refs.] [In Russian. German summary (5 lines).]

A number of observations conducted with the object of determining the factors influencing the appearance of haemorrhagic diathesis in malaria.

C. A. Hoare.

ADVIER. Deux cas d'infection malarique sans manifestation clinique.—*Marseille-Méd.* 1931. Mar. 25. Vol. 68. No. 9. pp. 420-423. [7 refs.]

BANERJI (Kali Gati). Atypical Cases of Malaria as seen in the Recent Outbreak in Birbhum.—*Calcutta Med. Jl.* 1931. June. Vol. 25. No. 12. pp. 454-463.

V. BERKESY (L.). Ueber die Entstehung der Malariainfektionen im Vorfrühling.—*Wien. Klin. Woch.* 1931. Aug. 28. Vol. 44. No. 35. pp. 1110-1112. [Med. Clinic, Franz Joseph Univ., Szegedin, Hungary.]

BEY (Sami). Les difficultés du diagnostic clinique de la malaria.—*Rev. Prat. Malad. des Pays Chauds.* 1930. Dec. Year 9. Vol. 10. No. 12. pp. 570-572.

BLANC (F.) & GOIRAN (E.). A propos d'un cas de paludisme autochtone.—*Marseille-Méd.* 1931. Mar. 25. Vol. 68. No. 9. pp. 417-419. With 1 chart in text.

BUTT (N. M.). A Simple and Inexpensive Portable Screener for Use with Paris Green Diluents.—*Records of the Malaria Survey of India.* 1931. June. Vol. 2. No. 2. pp. 333-335. With 1 text fig.

CASTILLON (T. J. E. L.). La lutte antipaludique dans les Etats sous mandat français: Alexandrette (1919-1929).—*Arch. Méd. et Pharm. Milit.* 1931. Apr. Vol. 94. No. 4. pp. 541-574. With 2 maps, 1 chart & 4 figs. [Refs. in footnotes.]

COLLIER (W. A.) & WARSTADT (A.). Untersuchungen ueber die Wirkung eines neuen Malariamittels bei der Malariainfektion des Kanarienvogels und des Menschen.—*Klin. Woch.* 1931. May 23. Vol. 10. No. 21. pp. 987-988. [Robert Koch Inst. for Infectious Diseases, Berlin.]

COSTANTINI (Henri). Paludisme et chirurgie.—*Riv. di Malarologia*. 1930. Nov.-Dec. Vol. 9. No. 6. pp. 759-776. [41 refs.] [Surg. Clinic, Mixed Faculty of Med. & Pharm., Algiers.]

CUBONI (E.) & MILANI (C.). Inoculazione della malaria nell'uomo ed immunità antimalarica.—*Boll. Istituto Sieroterap. Milanese.* 1931. May. Vol. 10. No. 5. pp. 225-236. With 3 text figs. [14 refs.]

DECOURT (Philippe). Index splénique et rapport splénique d'endemicité.—*Rev. Méd. et Hyg. Trop.* 1931. May-June. Vol. 23. No. 3. pp. 141-145. [2 refs.]

DA FONSECA (Olympio), Jr. Bases scientificas e realização pratica da prophylaxia do impaludismo.—*Rev. Med.-Cirurg. do Brasil.* 1931. Mar. Vol. 39. No. 3. pp. 65-96.

GEIGER (J. C.) & GRAY (J. P.). Note on an Outbreak of Malaria in a Railroad Camp, Rawson Switch, Calif.—*Public Health Rep.* 1931. Mar. 6. Vol. 46. No. 10. pp. 516-518.

- GUY (Roger). Note sur quelques documents relatifs au paludisme dans le Haut-Mékong.—*Bull. Soc. Méd.-Chirurg. Indochine*. 1931. May. Vol. 9. No. 5. pp. 305-338. With 5 graphs. [4 refs.]
- HOPKINS (H. O.). Pancreatic Efficiency Tests in Malaria.—*Bull. Inst. Med. Res. Federated Malay States*. 1929. No. 1. 8 pp. [20 refs.]
- KLIGLER (I. J.). Organisation du controle malarique en Palestine.—*Rev. Prat. Malad. des Pays Chauds*. 1930. Dec. Year 9. Vol. 10. No. 12. pp. 564, 566-569.
- LEBLANC (L.). Le problème de la malaria à la Fomulac.—*Ann. Soc. Belge de Méd. Trop.* 1931. Mar. 31. Vol. 11. No. 1. pp. 47-57. With 1 chart & 1 map.
- MORIN (Henry G. S.). Sur l'organisation du service antipaludique des Instituts Pasteur d'Indochine.—*Bull. Soc. Méd.-Chirurg. Indochine*. 1931. May. Vol. 9. No. 5. pp. 271-280. [Pasteur Inst., Hanoi.]
- MORISHITA (Kaoru), NAMIKAWA (Hiroshi), MATSUURA (Tamotsu) & TANIKAWA (Kunishizu). Report on the Malaria Epidemic in Uzanto and its Control, with Special Reference to the Effect of all Quininization.—*Taiwan Igakkai Zasshi (Jl. Med. Assoc. Formosa)*. 1931. July. Vol. 30. No. 7 (316). [In Japanese. English summary pp. 53-54.] [Govt. Research Inst., Formosa.]
- O'FLYNN (J. A.). Control of Malaria at H.M. Naval Base, Singapore (1925-1927).—*Jl. State Med.* 1931. Aug. Vol. 39. No. 8. pp. 446-452.
- ROCHA (Francisco). Malaria Control at "Mina de S. Domingos."—*Arquivos Inst. Bact. Camara Pestana*. 1930. Vol. 6. No. 2. pp. 123-137. With 1 folding plan, 1 folding map & 2 folding charts. [17 refs.] [Camara Pestana Inst., Lisbon.]
- ROSS (G. A. Park). The Routine Treatment and Prophylaxis of Malarial Fever.—*Jl. Med. Assoc. South Africa*. 1931. Mar. 14. Vol. 5. No. 5. pp. 146-148. [7 refs.]
- SARKAR (Sarasi Lal). A Malaria Survey in Noakhali District, Bengal.—*Indian Med. Gaz.* 1931. June. Vol. 66. No. 6. pp. 322-326. With 1 map in text.
- SCHORLEMMER (R.). Kann eine vorausgegangene Malaria mit Darmstörungen Jahre hindurch ursächlich für periodisch einsetzende Reizzustände und Geschwürsbildung im Dickdarm in Frage kommen? Ein dem Reichs-Versorgungsgericht auf Ansuchen erstattetes Gutachten.—*Arch. f. Verdauungs Krankh.* 1931. June. Vol. 49. No. 5-6. pp. 315-332.
- SINTON (J. A.). The Treatment of the Malarial Fevers.—*Malayan Med. Jl.* 1931. June. Vol. 6. No. 2. pp. 33-37.
- SPENCER (H. H.). The Malarial Syndromes.—*Jl. Med. Assoc. South Africa*. 1931. May 9. Vol. 5. No. 9. pp. 275-278.
- TANON (L.), CAMBESSÉDÈS (H.) & DECOURT (Ph.). Enquête sur le traitement du paludisme.—*Rev. Méd. et Hyg. Trop.* 1931. Mar.-Apr. Vol. 23. No. 2. pp. 65-85.

REVIEWS AND NOTICES

Proceedings of the Celebration of the Three Hundredth Anniversary of the First Recognized Use of Cinchona. Held at the Missouri Botanical Gardens, St. Louis, October 31-November 1, 1930.—258 pp. With 7 plates. 1931. St. Louis, Mo., U.S.A.

The Missouri Botanical Garden where this congress was held has a large lecture hall, a very fine library, and a garden of 1,600 acres which contains the greatest collection of orchids in the world. The congress was attended by many whose names are well known in connexion with quinine; among them were Dr. KERBOSCH, director of the government cinchona estates and experimental station in Java, whence comes 97 per cent. of the world's supply of bark; Dr. VAN LINGE, president of the Nederlandsche Kininefabriek and head of the so-called Dutch quinine monopoly; Dr. Karl MERCK, president of E. Merck of Darmstadt; Mr. BESANT, director of the Botanical Gardens in Glasgow; Messrs. G. D. and J. ROSENGARTEN of Philadelphia, whose firm produced quinine in 1823, three years after it was first isolated by PELLETIER and CAVENTOU, and many other well-known American quinologists. It is not surprising that, with such a company, the published Proceedings are of very great interest. Dr. KERBOSCH's paper on the history of cinchona in Java is too important to be dealt with in a short review, and a separate summary of it will be found on page 817 of this *Bulletin*. The debt of gratitude which the world owes to the Dutch for the scientific cultivation of the cinchona tree was acknowledged at the banquet which terminated the congress, by the playing of the Dutch national anthem, while all the guests stood in silence. One of the guests at this banquet told how W. H. PERKIN was attempting to synthesize quinine in 1852, when he made, by accident, mauve, the first of the synthetic dyes, and how von HOFMANN came over to England, learned Perkin's method of work, and went back to Germany to establish the famous aniline dye industry.

Dr. Leo SUPPAN contributed a scholarly paper entitled "Three Centuries of Cinchona," which occupies 120 pages of the Proceedings and contains 150 references. It is probably the most complete and concise history of cinchona which has been written in English. When the drug was first introduced into Europe it met with great opposition; the Galenists were bitterly opposed to it, and the Protestants, who scented a Romanist plot, announced that the bark was an insidious poison which the Jesuits had brought to Europe to exterminate them.

The early immigrants to the Mississippi Valley suffered terribly from malaria, and the political enemies of Thomas Jefferson protested that in the Louisiana Purchase the United States had acquired a swamp unfit for habitation. To-day it is the home of millions, and Dr. Robert TERRY in his address to the congress gave an interesting account of Dr. John SAPPINGTON, a pioneer in the use of quinine, whose work did so much to make the colonization of the Valley possible in the early days of the nineteenth century.

Dr. R. ROSENGARTEN and Dr. T. SOLLMANN dealt with the alkaloids of cinchona bark, and it is interesting to note that chinoidin may prove of great use in the moth-proofing of furs and fabrics. Dr. SOLLMANN pointed out that though EHRLICH invented the name chemotherapy, the phenomenon was recognized before his day, and was exemplified by cinchona. Its mode of action is still, as he said, unknown. Direct parasitidal action does not account for it; blood incubated for 24 hours with 1 in 10,000 quinine is still infective, and the concentration of quinine in the circulating blood cannot be maintained nearly as high as this. The assumption of toxic transformation in the body is unsupported by chemistry and the effect of quinine is too prompt to give opportunity for the manu-

facture of antibodies. Dr. Kenneth MAXCY pointed out, in the paper which he contributed on the rôle of quinine in malaria, that though quinine may inhibit the movements and growth of malaria parasites *in vitro*, such experiments are inconclusive, for there are many substances which would act in the same way though they are totally without effect in the treatment of malaria.

W. Fletcher.

RÖDER (Richard). Die anthropogeographische Bedeutung der Malaria. [Geographical Distribution of Malaria.]—*Janus*. 1930. Jan., Feb., Mar., Apr. & May-June. Vol. 34. Nos. 1, 2, 3, 4, 5 & 6. pp. 1-29; 38-64; 71-96; 121-128; 142-176. With 5 text figs. & 1 folding map. [Refs. in footnotes.]

This essay on the significance of the anthropogeography of malaria has been compiled by Dr. Röder with the help of Professors Dr. Karl SAPPER and Dr. Georg STICKER. It begins with a short description of malaria and of the plasmodia that cause its separate types. Then follows a long section dealing with the geographical distribution over the different continents in time and space. Figures and charts are given to show the progress of the disease for such periods as can be connected with facts and statistics. In England and northern Europe malaria is not at the present day of serious importance; but in the south and south-east its influence on life is still serious. Of the Americas much the same may be said, comparative freedom in the north, greater frequency in Southern, Central and S. America. It is in the wide belt of tropical and subtropical regions that the relation between malaria and anthropology is most serious and important. The statistics of morbidity and mortality only tell part of the story. There are thousands of cases in Asia, Africa, etc., never showing a high rate of "fever" but practically all their lives subject to malarial infection, and this applies to children as well as adults. The weakness and anaemia produced lessens the working and productive power of individuals, reduces the vigour of the population and has an evil influence on the history of nations. There is also less chance of healthy colonization in areas strongly infected and colonists or excess population can only make use of such areas when the scourge of malaria has been reduced as far as is possible—e.g., Panama. It would appear that although malaria confers no lasting immunity on the sufferers there may be, in time, developed a certain racial resistance though not of great value. The moving of infected people into non-infected areas is a danger to be considered since if suitable anopheles carriers are present the disease may spread. Examples of this were seen in France and England during and after the war of 1914-18. The authors devote some pages to the geographical distribution of the Anopheles. The conditions for the spread of malaria being what they are it becomes a matter of anthropological importance that swampy areas should be drained and cultivated; but this is not always possible since crops such as rice, jute and flax require large quantities of water and encourage mosquitoes. Houses must be properly screened to prevent mosquitoes reaching infected or healthy persons and quinine must be available for treatment. The most difficult and expensive work is the destruction of larval and adult mosquitoes. The abolition of malaria in any area is a boon to mankind. Much has been done during the last fifty years to eradicate the disease in various parts of the world; but far more remains to be done. Dr. Röder writes as a conclusion: "Man hat die Bedeutung der Malaria für das Leben und das Glück der Völker stark übertrieben"!

J. H. Tull Walsh.

COVELL (Gordon) [M.D. (Lond.), D.P.H., D.T.M. & H. (Eng.), Major, Indian Medical Service, Assistant Director, Malaria Survey of India]. **Malaria Control by Anti-Mosquito Measures.**—pp. ix+148. With 13 text figs. & 2 plates. Calcutta & Simla: Thacker, Spink & Co., Ltd. London: W. Thacker & Co., 2 Creed Lane, E.C. [7s. 6d.]

The papers which have been written about anti-mosquito measures are so numerous, and they have been published in so many different journals, that it has become difficult to keep in touch with them. Major Covell has made a successful attempt to remedy this by collating the information which they contain, and in this book he gives a concise account of the methods advocated. Part I deals with protection against mosquito bites by means of nets, culicifuges, and screening. Part II deals with the destruction of adult mosquitoes by traps, fumigation, sprays, and the like. Part III, which is the largest section, describes the many methods of larva control; it is divided into two subsections, (a) giving details of the different methods, and (b) indicating the special means which should be employed in special conditions; e.g., the respective measures which should be adopted in dealing with streams and with swamps. It is impossible, as the author says, to deal very fully with the subject of drainage in a book of this kind, but the various methods of oiling and of distributing Paris green have been treated in considerable detail. A list of the places where anti-mosquito apparatus can be purchased is given in an appendix, together with the prices of the various articles; as the book is intended primarily for use in India, the firms mentioned are nearly all in that country and the prices are given in rupees. There is a useful bibliography containing 570 references. Among the many control measures mentioned, some are of doubtful value; the author gives his own opinion of them in a number of cases, but, in others, the reader has to make his choice unaided. For instance, on page 76 one finds "cactus paste has been used in North Africa by the French. . . . This is spread on the surface of stagnant water and forms a layer which prevents the larvae coming to the top to breathe. It is claimed that this paste can act for weeks, months, or even years." It is only on turning to the Bibliography that one finds that this information comes from a paper published 25 years ago. The section on Paris green contains much practical information and should be of great use in India.

W. Fletcher.

GARDNER (Gérard) [Docteur de l'Université de Paris, Chargé de cours à la Faculté des sciences de l'Université de Montréal et à l'Ecole des Hautes Etudes commerciales]. **Recherches sur les spirochétidés dans le district de Montréal.** [Researches on the Spirochaetes of Montreal.]—88 pp. With 7 plates (2 double). 1930. Paris: Editions médicales. 7 rue de Valois (1er).

The first part of this thesis, comprising a third of the volume, is devoted to a discussion of the general characteristics of spirochaetes, including nomenclature. The author then proceeds to give records of his observations on spirochaetes in Canada, which are of interest for comparison with those from other parts of the world.

Fresh water from various sources was examined both directly after collection and also after standing with the addition of hay, peptone, sugar, etc. The results show that the Canadian waters are extremely poor in spirochaetes as compared with those of Europe. Sea water was also examined and contained various types resembling those recorded from other parts of the world. By the maceration of vegetation in sterile tap water a number of spirochaetes were obtained including *S. biflexa*, *S. pseudo-ictero-haemorrhagiae*, and in particular a distinct type referred to

as the "type de la Phléole" cultivated from timothy grass. This spirochaete resembles *S. plicatilis* but is very much shorter, a maximum of 15μ instead of lengths up to 500μ . Among other observations on the morphology of this spirochaete it is stated that the addition of 1-1000 oxazine causes the surface membrane and granulations to become distinct and also reveals the existence of an axial filament.

The intestines of a number of animals both vertebrate and invertebrate were examined with negative results, but spirochaetes were obtained by cultivation of the cud of a cow, and a number of rabbits were found to be infected with *S. cuniculi* and to harbour a spirochaete in the caecum.

A separate section is devoted to the problem of the occurrence of *S. icterohaemorrhagiae* in nature, and in common with practically all other observers, he found strains of free living leptospira to be non-pathogenic. Nevertheless after being cultivated for two or three years these free-living strains acquired certain characteristics of the pathogenic type, in particular, agglutinability by human convalescent serum from cases of Weil's disease.

Finally the author gives the results of exposing spirochaetes to the action of cold, cultures of *S. icterohaemorrhagiae* being kept at a temperature of approximately -15°C . The spirochaetes were found to gradually lose their motility and break up into granules, and subcultures of these forms were negative. It would seem that the comparative rarity of spirochaetes in Canadian waters may be attributed to the low winter temperatures which are probably fatal to most free living forms.

E. Hindle.

JORDAN (Edwin Oakes) [Chairman of the Department of Hygiene and Bacteriology, University of Chicago]. **Food Poisoning and Food-borne Infection.**—pp. xi+286. With 22 text figs. 1931. Chicago, Illinois: University of Chicago Press. London: Cambridge University Press, Fetter Lane. [11s. 6d.]

A review of this work (by Dr. W. G. Savage) will be found in the *Bulletin of Hygiene*, Vol. 6, p. 726. The reviewer writes—

"The volume may be recommended as a very readable and comprehensive account of the varieties of food poisoning."

We record with much regret the death on November 27 of SIR DAVID BRUCE. Sir David had been a member of the Honorary Managing Committee since the institution of the Tropical Diseases Bureau in 1912, and previously of the Sleeping Sickness Bureau (1908-12).

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The bracketed abbreviations after the page numbers indicate the subjects.
Page numbers within brackets indicate papers not summarized.

Am. signifies Amoebiasis	and	Amoebic	Lep. signifies Leprosy.	
Bb. "		Dysentery.	Lept. "	Leptospirosis.
Bl. "		Beriberi and Epidemic Dropsy.	Mal. "	Malaria.
B.R. "		Blackwater.	Misc. "	Miscellaneous.
Chl. "		Book Review.	Myc. "	Tropical Mycology.
C.Bu. "		Cholera.	Oph. "	Tropical Ophthalmology.
Der. "		Climatic Bubo and Lympho-	Pel. "	Pellagra.
Dys. "		granuloma Inguinale.	Pl. "	Plague.
Fev. "		Tropical Dermatology.	Rab. "	Rabies.
G.V. "		Dysentery (Bacillary and	R.B.F. "	Rat-Bite Fever.
Hel. "		Unclassed).	R.F. "	Relapsing Fever and other
Hist. "		Fevers.		Spirochaetoses.
H.S. "		Granuloma Venereum.	Sp. "	Sprue.
K.A. "		Helminthiasis.	S.S. "	Sleeping Sickness.
Lab. "		Historical.	Und. "	Undulant and Abortus Fever.
		Heat Stroke.	Y.F. "	Yellow Fever.
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 v. Albertini, A., with Löffler, 86 (Und.)
 Alden, H. S., with Jones, 402, 404 (Der.)
 Alessandrini, M., 992 (Mal.)
 Alfredo, J., 51 (Misc.)
 Ali, M., 652 (Lep.)
 — & El-Dalgamony, A., 962 (Lep.)
 Alivisatos, G. P., 274 (Dys.)
 de Almeida, F. P., 419 (Myc.)
 de Almeida, M. O., 53 (Misc.)
 Althausen, A. J., with Skirjabin & Schulman,
 683 (Hel.)
 Amako, T. H., 915 *bis* (S.S.)
 Ambrogio, A., (658) (Lep.)
 Amies, C. R., 597, 599 (Mal.)
 Amigues, M., 951 (Bl.)
 Amoss, H. L. & Poston, M. A., 89 (Und.)
 Ananian, S., 586 (Mal.)
 Anazawa, K., 1016 (Mal.)
 van Andel, M. A., 802 (Hist.)
 Anderson & Dunn, 381 (Pl.)
 Anderson, C., with Nicolle, 307, 731 (R.F.)
 —, with — & Le Chuiton, 731 *bis* (R.F.)
 Anderson, G. V. W., 130 (Mal.)
 Anderson, H. H., with Chen, 850 (Misc.)
 — with — & Leake, 851 (Misc.)
 — & Koch, D. A., 791 (Am.)
 — & Leake, C. D., 67, 851 (Misc.)
 — with Rinehart, 850 (Misc.)
 Anderson, T., with Levaditi, Selbie & Schoen,
 302 (R.F.)
 Ando, K., Kurauchi, K. & Nishimura, H.,
 383 (Pl.)
 de Andrade, A. & Pinto, S. C. F., (146) (Mal.)
 André, M., 535 (Z.)

- Andrews, J., Johnson, C. M. & Dormal, V. J., 372 (S.S.)
 — & Paulson, M., 485 (Z.), 785 (Am.)
 —, with Tsuchiya, 488 (Z.)
 d'Anfreville de la Salle, 128 (Mal.)
 Anglo-Persian Oil Company, Limited, 339 *bis* (B.R.)
 Anguera, A., 318 *bis* (R.B.F.)
 Anigstein, L., 95 (Fev.)
 Anklesaria, J. A., 560 (Lab.)
 Annales de la Société Belge de Médecine
 Tropicale, 557 (Lab.)
 Antunes, A., (658) (Lep.)
 Apostolopoulos, K. G., (94) (Fev.)
 Araf, (146) (Mal.)
 Araf, M. A., 266 (Am.)
 —, with Biggam, 277 (Dys.)
 Aragão, H. de B., 144 (Mal.) (296 *bis*), 717 (Y.F.)
 — & Lima, A. da C., (296 *bis*) (Y.F.)
 de Araujo, E., 312, 315 (Lep.)
 —, with Silva, 165 (K.A.), 405 (Der.)
 de Araujo, E. L. F., 695 (B.R.)
 Archer, G. T. L., (241) (Hel.)
 Archer, V. W. & Peterson, C. H., 688 (Hel.)
 Archibald, R. G., 102 (Fev.)
 Archives des Instituts Pasteur d'Indochine, 250 (Rab.)
 Arias Aranda, C., 163 (K.A.)
 Aristarkhova, O., (394) (Pl.)
 Armand-Delille, P. F., Hurst, A. F. & Sorapure, V. E., 56 (Misc.)
 Arnaud, A., Fornara, Vigoni & van Hoof, 932 (Y. & S.)
 Arnell, H. M., 10 (Bl.)
 Arnold, L. & Shapiro, 435 (Chl.)
 Arthus, M., 549, 550 (Z.)
 Artom, M., 403 (Der.)
 Ascano-Rodriguez, J. B., 109 (Mal.)
 Asheshov, I. N., Khan, S. & Lahiri, M. N., 880 (Chl.)
 —, Taylor, J., Morison, J., Malone, R. H. & Iyengar, 863 (Misc.)
 Ashford, B. K., 417 *bis* (Myc.)
 — & Dowling, G. B., 73 (Misc.)
 —, McKinley, E. B. & Dowling, G. B., 425 (Myc.)
 Ashford, M. & Quinnell, E., 699 (Und.)
 Aslett, E., with Willoughby, 789 (Am.), 1001 (Mal.)
 Assali, J., with Blondin, (801) (Am.)
 —, with Crozat, 838 (Misc.)
 — & Popoff, S., 385 (Pl.)
 van Assendelft, F., 779 (B.R.)
 de Assumpção, L., (280) (Dys.)
 Atkey, O. F. H., 20 (Misc.)
 Atkinson, H., with Griffiths-Jones & Hassan, 668 (Hel.)
 Aubin, 617 (Fev.)
 —, with Gougerot, 324 (Lep.)
 Aubry, G., 414 (Der.)
 Auchincloss, H., with O'Connor & Golden, (692) (Hel.)
 Audibert, V. & Battaglini, 627 (Fev.)
 — & Murat, 100 (Fev.)
 Aujeszky, A., 751 (Rab.)
 d'Aunoy, R. & Beven, J. L., 745 (Rab.)
 — & Miller, J. W., 251 (Rab.)
 Aureli, B. W., with Tegoni, 120 (Mal.)
 Avaritsiotis, 93 (Fev.)
 Averbouch, I., 1018 (Mal.)
 Aykroyd, W. R., 31, 33 (Misc.), 457 (Bb.)
 Azam, A., with Schwartz & Yovanovitch, 181 (Hel.)
- B**
- Babiet, J., 77 (Misc.)
 —, Joyeux, B. & Leclerc, 245 (Rab.)
 Bacigalupo, J., 210 (Hel.), 544 (Z.)
 Badger, L. F., 962 (Lep.)
 Baharilal, with Wilkinson, Stubbs & Desai, 988 (Mal.)
 Bailey, H. W., with Hornby, 924 (S.S.)
 Bailly, J. & Michel, R., 257 (Rab.)
 —, with Remlinger, 243, 250, 254, 255, 741 *bis*, 742 *bis*, 744, 747, 750, 751 (Rab.), 303, 304 (R.F.)
 —, with — & Palmowitch, 745 (Rab.)
 Baily, J. D., with Covell, 578 (Mal.)
 Balachewa, M. T., 644 (K.A.)
 Balina, P. I., 326 (Lep.)
 Ballif, L., with Ciuca, Irimesco, Franke, Constantinesco & Vieru, 136 (Mal.)
 —, with — & Vieru, 119 (Mal.)
 Balozet, L., with Velu & Zottner, 734, 736 *ter*, 738 (R.F.)
 Banerjee, R., with Brahmachari, 643 (K.A.)
 —, with — & Sen, 624 (K.A.)
 Banerjee, K. C., (146) (Mal.)
 Banerjee, K. G., 213 (Hel.)
 Banerji, K. C., 205 (Hel.)
 Banerji, K. G., (1031) (Mal.)
 Bannister, K., 299 (R.F.)
 Barada, K., 410 (Der.)
 Barbieri, A., 990 (Mal.)
 Barchi, L., 256 (Rab.)
 Bardenat, F., with Lemaire, 875 (Pl.)
 Bardet, J., with Levaditi, Tchakirian & Vaisman, 908 (S.S.)
 Barlovatz, A., 898 (S.S.)
 Barlowatz, 899 (S.S.)
 Barneoud, (241) (Hel.)
 Barrada, M. A., 480 (Oph.)
 Barraud, P. J., 1015 (Mal.)
 Barroso, S., 296, (296) (Y.F.)
 Barrow, J. V., with Woodward, S., 787 (Am.)
 Barrowman, B., 1029 (Mal.)
 Barton, J. K., 31 (Misc.)
 Baskin, M. M., 733 (R.F.)
 Basombrío, G. A., (964) (Lep.)
 Bass, C. C., 134 (Mal.)
 Bassler, A. & Lutz, J. R., 660 (Sp.)
 Bassoe, P. & Grinker, R. R., 245 (Rab.)
 Basu, B. C., (147) (Mal.)
 Basu, D. N., with Hamilton, & van Haeften, 886 (H.S.)
 Basu, U. P., with Chopra, 461 (Bb.)
 Battaglini, with Audibert, 627 (Fev.)
 de Baudre, (13) (Bl.)
 Bauer, J. H., with Beeuwkes & Mahaffy, 283 (Y.F.)
 Baumann, H., with Schwetz, 173 *bis*, 194 (Hel.)
 —, with — & Cabu, 128 (Mal.)
 Baumgartner, E. A., 659 (Sp.)

- Baumgartner, E. A. & Case, C. E., 663 (Sp.)
 — & Jewett, C. H., 659 (Sp.)
 — & Smith, G. D., 661 (Sp.)
 Beagley, K. E., with Phelps, Smith, Carroll
 & Washburn, 215 (Hel.)
 Beam, M. P., with Mendelson, 662 (Sp.)
 Bedford, H. W., 526 (Z.)
 Bedier, E., 581 (Mal.)
 Beer, W. A., with Iyengar, 249 (Rab.)
 Beeuwkes, H., Bauer, J. H. & Mahaffy, A. F.,
 283 (Y. F.)
 —, Walcott, A. M. & Kumm, H. W., 858
 (Misc.)
 Beharilal, K., with Wilkinson, Stubbs &
 Desai, 988 (Mal.)
 Beigleman, M., 476 (Oph.)
 Beihefte zum Archiv für Schiffs- und Tropen-
 Hygiene, 29 (Misc.)
 Beijnen, G. K., 271 (Am.)
 Belfort, F. & da Silveira, F., 856 (Misc.)
 Bell, L. N., with Woods, Sr., 638 (K.A.)
 Bell, W. H., 795 (Dys.)
 Belot, R., 967 (Oph.)
 Belt, T. H., with Klotz, 287, 288 *ter* (Y.F.)
 Beltukow, N., 645 (K.A.)
 Benarroch, E., 230 (Hel.)
 Bennett, H. L., 1029 (Mal.)
 Benoit, G., with Fournneau & Tréfouel, M. &
 Mme., 64 (Misc.)
 —, with —, —, Stefanopoulo, de
 Lestrangle & Melville, 64 (Misc.)
 Bercovitz, Z., 671 (Hel.)
 Bergsma, S., 49, 860, 865 (Misc.)
 v. Berkesy, L., (1031) (Mal.)
 van Berkhout, P. J. T., 862 (Misc.)
 Berlin, A., 392 *bis* (Pl.), 408 (Der.)
 Bernard, L., (866) (Misc.)
 Bernardo, S. S., (147) (Mal.)
 Bernasconi, V., 159, 163 (K.A.)
 Berret, H., 59 (Misc.)
 Bessemans, A. & Thury, U., 311 (Lept.)
 Besson, A., 19 (Misc.)
 Bethell, S. E., 637 (K.A.)
 Bevan, L. E. W., 86, 702 (Und.)
 Beven, J. L., with d'Aunoy, 745 (Rab.)
 Bevier, G., with Peña Chavarria & Serpa, 281
 (Y.F.)
 Bey, S., (1031) (Mal.)
 Beyer, A., with Georgi, 467 (Pel.)
 Bezemer, F., 275 (Dys.)
 Bezsonova, A. & Lokhov, M., 394 (Pl.)
 Bhandarkar, P. R., (866) (Misc.)
 Biddau, I., (13) (Bl.)
 Bideau, with Marcandier, 97 (Fev.)
 Bigelow, J. B., with Gay, 402 (Der.)
 Biggam, A. G., 277 *bis* (Dys.), 783 (Am.)
 — & Arafa, M., 277 (Dys.)
 Bijl, J. P. & Korthof, G., 308 (Lept.)
 Binet, L. & Fabre, R., 847 (Misc.)
 Birch, C. A., 454 (G.V.)
 Bird, J., 820 (Hist.)
 Biswas, N. B. G., (147) (Mal.)
 Blackham, R. J., with Lukis, 869 (B.R.)
 Blackie, W. K., 224 (Hel.)
 Blacklock, D. B., 755, 756 (Misc.), 926 (Y. &
 S.)
 Blajin, A. N., 675 (Hel.)
 Blakemore, W. L., 79 (Misc.)
 Blanc, F. & Goiran, E., (1031) (Mal.)
 Blanc, G. & Caminopetros, J., 91, 618, 628
 (Fev.), 153, 640 (K.A.), 1006 (Mal.)
 —, Joannides, G. & Papaioannou, A., 404
 (Der.)
 — & Valtis, J., (648) (K.A.)
 Blanchard, M., 53 (Misc.), 949 (Bl.)
 — & Toullec, F., 898 (S.S.)
 Blondin, P. & Assali, J., (801) (Am.)
 Blümmers, K., with Löhe, 453 (C.Bu.)
 Boase, A. J., 6 (Bl.)
 Bodechtel, G., 305 (R.F.), 604 (Mal.)
 de Boer, H. S., 584 (Mal.)
 Bogopolsky, M., 1030 (Mal.)
 Boinet, (147) (Mal.)
 — & Pieri, J., 626 (Fev.)
 Boisseau, R., with Sicé, 243 (Rab.), 379 (S.S.)
 —, with —, Provost & Deniel, 901 (S.S.)
 —, with Vaucel, 796 (Dys.), 905 (S.S.)
 Boletín de la Oficina Sanitaria Panamericana,
 219 (Hel.)
 Bollman, J. L., with Essex, (241) (Hel.)
 Bonacci, H., 923 (S.S.)
 Bonan, H., with Broc, 86 (Und.)
 Bonanno, A. M., 675 (Hel.)
 Bonne, C., 405 (Der.), 514, 536 (Z.), 678 (Hel.)
 Bonne, W. M., 696 (B.R.)
 Bonne-Wepster, J., 509 *bis* (Z.)
 —, with Walch, 833 (Misc.)
 Bonnin, H., 187 (Hel.), 396 (Der.), 993 (Mal.)
 Boquien, Y., with Laignel-Lavastine &
 Puymartin, (740) (Lept.)
 —, with Troisier, 309, 311 (Lept.)
 Borchardt, W., 137 (Mal.), 861 *bis*, 862 *ter*
 (Misc.)
 —, with Kestner, 862 (Misc.)
 Bordes, L. A., with Mesnard, 580 (Mal.)
 Borel, E., 335 (B.R.)
 Borrel, A. & Larrousse, F., 658 (Lep.)
 Borthwick, T. C., 795 (Am.)
 Borzone, R. A., 162 (K.A.)
 Bosch, W. G., 594 (Mal.)
 Bose, B. K., with Boyd, 155 (K.A.)
 Bose, K., 1030 (Mal.)
 Botreau-Roussel & Huard, P., 685 (Hel.)
 Bouček, J., 256 (Rab.)
 Boucher, H., 776 *bis* (Misc.)
 Bouffard, 765 (Misc.)
 Bouffard, G., 344 (S.S.), 392, (394) (Pl.), 406
 (Der.)
 Bourguignon, G. C., 556 (Lab.)
 Bousquet, A., 100 (Fev.)
 Boyd, J. S. K., 794 (Am.)
 Boyd, M. F., 166 (B.R.), 510 (Z.)
 Boyd, T. C. & Bose, B. K., 155 (K.A.)
 — & Roy, A. C., 51 (Misc.), 216 (Hel.)
 Boyé, 251 (Rab.), 344 (S.S.), 760 (Misc.)
 Boyé, R. P., 691 (Hel.)
 Brahmachari, U., with Banerjea, R., 643
 (K.A.)
 —, with Sen, P. B. & Banerjea, R., 642 (K.A.)
 Brand, A. F., 528 (Z.)
 Brandau, G. M., 847 (Misc.)
 Brás de Sá, L. J., with de Mello & d'Abreu,
 1008 (Mal.)
 Brasil, V. & Vellard, J., 540 (Z.)
 Bray, G. W., 31 (Misc.)
 Brazil, V., Jr., 552 (Z.)
 van Breemen, M. L., with Walch & Reyntjes,
 1028 (Mal.)

- Brennan, C. H., 839 (Misc.)
 Bressot, E., (801) (Am.)
 Brewster, K. C., with Thonnard-Neumann & Camacho-Moya, 402 (Der.)
 Brighenti, D., 511 *bis* (Z.)
 Brinkmann, E., 1020 (Mal.)
 British Empire Leprosy Relief Association, 955 (Lep.)
 British Guiana, 564 (Lab.)
 Broc, 702 (Und.)
 — & Bonan, H., 86 (Und.)
 Brosius, O. T., 546 (Z.), 930 (Y. & S.)
 Brotzu, G., 1022 *bis* (Mal.)
 Broughton-Alcock, W. & Weinbren, M., 676 (Hel.)
 Brousses, A., 585 (Mal.)
 Brown, H. H., 78 (Misc.)
 Brown, J. Y., 79 (Misc.)
 Browne, D. C., 486 (Z.)
 Browning, C. H., Cohen, J. B., Ellingworth, S. & Gulbransen, R., 925 (S.S.)
 Browning, W. H., 541 (Z.)
 Brückner, 207 (Hel.)
 Brug, S. L., 171, 220 (Hel.)
 — & Haga, J., 536 (Z.)
 — & de Rook, H., 217 (Hel.)
 Brumpt, E., 189, 193 (Hel.), 629 (Fev.)
 — & Chevallier, P., 670 (Hel.)
 Brun, C., with Vaudremer & Sézary, 657 (Lep.)
 Brunelli, P., (801) (Am.)
 Brunsting, L. A., 934 (Y. & S.)
 Brussin, A. M. & Kalajev, A. W., 919 (S.S.)
 Bruxelles-Médical, 762 (Misc.)
 Buchanan, G. & Roux, P., 796 (Dys.)
 Buchanan, G. S., 883 (Chl.)
 Buchanan, R. E. & Fulmer, E. I., 168 (B.R.)
 Buchbinder, L., 295 (Y.F.)
 de Buck, A., with Swellengrebel, 1018 (Mal.)
 de Buen, S., 128, 591, 1008 (Mal.)
 Bulletin de l'Office Internationale d'Hygiène Publique, 392 (Pl.)
 Bunting, C. H., with Jones (692) (Hel.)
 Burgess, A. S., 389 (Pl.)
 Burgess, J. F. & Usher, B., 413 (Der.)
 Burke, A. W. & Davis, N. C., 289 (Y.F.)
 Burke-Gaffney, H. J. O'D., 837 (Misc.), 933 (Y. & S.)
 Burkitt, 134 (Mal.)
 Burnet, F. M., McKie, M. & Wood, I. J., 273 (Dys.)
 Burowa, L. F. & Moltschanow, S. A., 154 (K.A.)
 Bush, L. M., with Corke, 843 (Misc.)
 Butler, C. S., 439, 931 (Y. & S.)
 — & Hernandez, V., 828 (Hist.)
 Butt, N. M., (1031) (Mal.)
 Buxton, P. A., 47 (Misc.), 533 (Z.)
- 0
- Caballero, G. M., with Pardo-Castello, 653 (Lep.)
 Cabu, F., with Schwetz & Baumann, 128 (Mal.)
 Caffrey, P. J., 403 (Der.)
 Caius, J. F., Mhaskar, K. S. & Isaacs, M., 68 (Misc.)
 —, with —, 68 (Misc.)
- Calcutta, 778 (B.R.)
 Caldwell, E. L., with Caldwell, F. C. & Davis, 222 (Hel.)
 Caldwell, F. C., Caldwell, E. L. & Davis, G. E., 222 (Hel.)
 Callens, J., 330 (Lep.)
 Callerio, G., 232 (Hel.)
 Camacho-Moya, J., with Thonnard-Neumann & Brewster, 402 (Der.)
 Cambessédès, H., with Tanon & Decourt, (1032) (Mal.)
 Cameron, T. W. M., 204 (Hel.)
 Cameron, W. M., with Smyth, 102 (Fev.)
 Caminopetros, J., with Blanc, 91, 618, 628 (Fev.), 153, 640 (K.A.), 1006 (Mal.)
 Campos, E. de S., (925) (S.S.)
 Campos, F. M. & Campos, P. S., 241 (Hel.)
 Campos, N. de S., 325 (Lep.)
 Campos, P. S., with Campos, F. M., 241 (Hel.)
 Camps-Campins, J., with Pawan, 863 (Misc.)
 Canaan, T., 648 (K.A.)
 Candido, G., 745 (Rab.)
 Cannavò, L., (636) (Fev.)
 Cannon, P. R. & Taliaferro, W. H., 494 (Z.)
 Caragianopoulos, G., with Pédaros & Valsamaki, 628 (Fev.)
 Cardamatis, J. P., 486 (Z.)
 Carley, P. S., 1019 (Mal.)
 Carmody, E. P., 13 (Bl.)
 Carneiro, H., 715 (Y.F.)
 Caronia, G., 156 (K.A.)
 Carpano, M., 485 (Z.)
 Carpenter, G. D. H., 890 (S.S.)
 Carpentier, G., 46 (Misc.)
 Carranca Trujillo, R., (474) (Pel.)
 Carrion, A. L., 397 (Der.)
 Carroll, H. H., with Phelps, Smith, Washburn & Beagley, 215 (Hel.)
 Carrosse, 669 (Hel.)
 Carrosse, J., 188, 189 (Hel.)
 Cartaña, P., 603 (Mal.)
 Carter, H. F., 499 (Z.), 581, 582 (Mal.)
 Carvalho, A. E., with Prado, 114 (Mal.)
 Case, C. E., with Baumgartner, 663 (Sp.)
 Casoni, T., 788 (Am.)
 Castaneda, M. R. & Zinsser, H., 96 (Fev.)
 Castellana, A., 785 (Am.)
 Castellani, A., (280) (Dys.), 423 *bis* (Myc.), 429 (B.R.), 593 (Mal.), 776, (866) (Misc.)
 Castello, P. & Mestre, J. J., 414 (Der.)
 Casten, V., 67 (Misc.)
 Castex, M. R., Poletti, R. A. & López García, A., (280) (Dys.)
 Castillon, T. J. E. L., (1031) (Mal.)
 Castles, R., with Havens, 229 (Hel.)
 Catanei, A., 399 *bis* (Der.), 418 *bis* (Myc.)
 —, with Sergeant, Edm. & Sergeant, Et., 592 (Mal.)
 —, with —, —, Parrot, Foley & Senevet, 984 (Mal.)
 —, with —, —, Trenszt & Sergeant, A., 1013 (Mal.)
 —, with Sergeant, Et., 599 (Mal.)
 Cawadas, E., (147) (Mal.)
 Cawston, F. G., 66 (Misc.), 182, 192, 193, (241 *bis*) (Hel.), (552) (Z.)
 Cazamian, P., 886 (H.S.)
 Cazanove, (147) (Mal.), 297 (R.F.), 381 (Pl.)
 Cazanove, F., 93 (Fev.)

- Celli, A., 126 (Mal.)
 Celli-Fraentzel, A., 810, 814 (Hist.)
 Ceppi, E., 226 (Hel.)
 Cerqua, S., 214 (Hel.)
 Cerruti, C., 88 (Und.)
 Cerruti, C. F., 275 (Dys.)
 Cesarando, U. & Giordano, M., (552) (Z.)
 Ceylon, 499 (Z.), 610 (Mal.), 686 (Hel.)
 Chacon, A. L., 163 (K.A.)
 Chadwick, C. R., with Mills & Machattie, 158 (K.A.)
 Chagas, E., 377 (S.S.)
 Chaigneau, Y., 221 (Hel.)
 Chalam, B. S., 578 (Mal.)
 Chamberlain, W. P., 770 (Misc.)
 Champagne, R., with Senevet, 182 (Hel.)
 Chandler, A. C., Milliken, G. & Schuhardt, V. T., 217 (Hel.)
 Chaniotis, N., with Lorando, 615 (Fev.)
 Chantriot, 993 (Mal.)
 Chao, S. S., with Reiner & Leonard, 359 (S.S.)
 Charlier, M. & Charlier-Collon, N., 187 (Hel.)
 Charlier-Collon, N., with Charlier, 187 (Hel.)
 Chaskina-Munder, G., 275 *bis* (Dys.)
 Chatterji, C. D., (147) (Mal.)
 Chatterji, S. N., 652 (Lep.)
 Chen, F. K., with Kurotchkin, 396 (Der.)
 Chen, M. Y. & Anderson, H. H., 850 (Misc.)
 —, — & Leake, C. D., 851 (Misc.)
 Cherefeddin, O., 141 (Mal.)
 Cherian, P. V. & Vasudevan, A., 422 (Myc.)
 Chersneau, P., 441 (Y. & S.)
 — & Tran-Van-Manh, (241) (Hel.)
 Chesterman, C. C., 442 (Y. & S.), 857 (Misc.)
 Chevalier, G., 159 (K.A.)
 Chevallier, P., with Brumpt, 670 (Hel.)
 Chewtchenko, F. I., with Chodoukine & Sophiew, 641 (K.A.)
 China Medical Journal, 637, 639 (K.A.)
 Chin-Kyu-Sui, Shimokawa, H. & Kamizawa, O., (866), (867) (Misc.)
 Chitre, G. D., with Webster, 529 *bis* (Z.)
 Chiyuto, S., 330 (Lep.)
 Chodoukine, N. I., Saphiew, M. S. & Chewtchenko, F. I., 641 (K.A.)
 Chodukin, N. J., 165 (K.A.)
 — & Sofieff, M. S., 155 (K.A.)
 Chomereau-Lamotte, B., 50 (Misc.)
 Chopra, R. N., 67 (Misc.), 279 (Dys.)
 — & Basu, U. P., 461 (Bb.)
 — & Choudhury, S. G., 61 (Misc.)
 —, — & Rao, S. S., 216 (Hel.)
 — & De, N., 267 (Am.)
 — & Knowles, R., 137 (Mal.)
 Choremis, K., 92 (Fev.)
 Chorine, V., with Marchoux, 495 *bis* (Z.), 738 (R.F.)
 —, with — & Markianos, 656 (Lep.)
 Choudhury, S. G., with Chopra, 61 (Misc.)
 —, with — & Rao, 216 (Hel.)
 Chowdhury, K. L., with Macdonald, 987 (Mal.)
 —, with Roy, 112 (Mal.)
 —, with Strickland, 943, 945 (Bl.)
 Christopherson, J. B., 31, 75 (Misc.), 190 (Hel.)
 Chtcherbakoff, S. G., 771 (Misc.)
 Chu, F. T., Deitrick, S. & Chung, S. F., 732 (R.F.)
 Chu, H. J., with Hegner, 482 *bis* (Z.)
 Chukerbuti, J. C., 685 (Hel.)
 Chung, H. & Kurotchkin, T. J., 642 (K.A.)
 —, with —, 399 (Der.)
 — & Reimann, H. A., 643 (K.A.)
 Chung, S., with Chu & Deitrick, 732 (R.F.)
 Ciaburri, G., (147) (Mal.)
 Citron, H., 912 (S.S.)
 Ciuca, M., Ballif, L. & Vieru, M., 119 (Mal.)
 —, Irimesco, G., Ballif, L., Franke, M., Constantinesco, N. & Vieru, M., 136 (Mal.)
 Clark, E. B., 203 (Hel.)
 Clark, H. C., 483 (Z.)
 — & Dunn, L. H., 494 (Z.), 978 (Mal.)
 Clarke, J. T., 34 (Misc.)
 Clarke, T., 31 (Misc.)
 Claude, H. & Coste, F., 630 (Fev.)
 van Cleave, H. J., 780 (B.R.)
 Cleland, J. B., 14, (866) (Misc.)
 Clemesha, W. W. & Moore, J. H., 576 (Mal.)
 Cleveland, L. R. & Collier, J., 486, 493 (Z.)
 — & Sanders, E. P., 791, 792 (Am.)
 Clyde, D., 1025 (Mal.)
 Cochrane, R. G., 649, 657 (Lep.)
 Codounis, A., with Stefanopoulo, 295 (Y.F.)
 Codvelle, Jausion & Dutrey, 349 (S.S.)
 Cohen, A. J., with Rodenwaldt, 85 (Und.)
 Cohen, J. B., with Browning, Ellingworth & Gulbransen, R., 925 (S.S.)
 Colby, C. de W. & Schaffie, K., 232 (Hel.)
 Collier, J., with Cleveland, 486, 493 (Z.)
 Collier, W. A., 923 (S.S.)
 — & Warstadt, A., (1031) (Mal.)
 —, with —, 1013 (Mal.)
 Colombo, 559 (Lab.)
 Colomo de la Villa, G., with Suarez de Puga, 631 (Fev.)
 Comaroff, R., with Geiger & Kligler, 374 (S.S.)
 —, with Kligler & Geiger, 376 (S.S.)
 Compton, A., 389, 394 (Pl.)
 Conil, J., 9 (Bl.)
 Connal, A., 48 (Misc.)
 Connal, A., 554 (Lab.), 940 (Bl.)
 —, with Glover, 8 (Bl.)
 Connolly, P. P. D., 932 (Y. & S.)
 Conseil, E., 101 (Fev.)
 — & Durand, P., (395) (Pl.)
 —, with Durand, 98 (Fev.)
 —, with Weiss & de Gentile, 966 (Oph.)
 Constantinesco, N., with Ciuca, Irimesco, Ballif, Franke & Vieru, 136 (Mal.)
 Conte, H. S. V., with Ferreira, 748 (Rab.)
 Conterno, V., 702 (Und.)
 Cook, A. B., with Low, (866) (Misc.)
 Cook, C., 24 (Misc.)
 Cooke, F. H., 650 (Lep.)
 Cooley, T. B. & Lee, P., 40 (Misc.)
 Copanaris, P., 322 (Lep.)
 Corfield, C. E., with Self, (867) (Misc.)
 Corke, W. H. & Bush, L. M., 843 (Misc.)
 Cormack, R. P., with Jewell, 634 (Fev.)
 Corman, 852 (Misc.)
 Corpus, T., 773 (Misc.)
 Corradini, G., (147) (Mal.)
 Corson, J. F., 354, 369, 901, 902, 914 *bis*, 920 *bis*, 921 *bis* (S.S.)
 Cort, E. C., 9 (Bl.)
 Cort, W. W., with Schapiro, 174 (Hel.)
 Costa Mandry, O. & Garrido Morales, E., 795 (Dys.)

da Costa, S. F. G., 177 *bis*, 178 *ter*, 181 (Hel.)
 Costantini, H., (1031) (Mal.)
 Coste, F., with Claude, 630 (Fev.)
 Coutts, F. J. H., 829 (Hist.)
 Couvy & Popoff, 839 (Misc.)
 Couvy, L., 389 (Pl.)
 — & Popoff, 386 (Pl.)
 Covell, G., 578, 973 (Mal.), 1035 (B.R.)
 — & Baily, J. D., 578 (Mal.)
 Coventry, F. A., 491 (Z.)
 Craig, C. F., 262 (Am.)
 Craighead, A. C., 749 (Rab.)
 Craste, 133 (Mal.)
 Crawford, H. & Gutteridge, N. M., 662 (Sp.)
 van Creveld, S., (692) (Hel.)
 Croce, C., with Greenway, (552) (Z.)
 Croll, D. G., 54 (Misc.)
 Croste, R., 676 (Hel.)
 Croveri, P., 22 (Misc.)
 Crozat, P. & Assali, J., 838 (Misc.)
 Cruz, M. C., with Samson & Lara, 329 (Lep.)
 Cruz, O., Jr., with Godoy & Lobo, 586 (Mal.)
 Cuboni, E. & Milani, C., (1031) (Mal.)
 Cudlipp, J. S., 546 (Z.)
 Cuff, C. H., 204 (Hel.)
 Cumming, H. S., 883 (Chl.)
 da Cunha, A. M., 646 (K.A.)
 Curasson, G. & Dischamps, A., 742 (Rab.)
 Curran, J. A. & Feng, S. T., 538 (Z.)
 Cushing, E. C., with Laake, 528 (Z.)
 Cusumano, A., 262 (Am.)

D

Dabbadie, P., 243 (Rab.)
 Dagnino, V., (866) (Misc.)
 Daleas & Haslé, 245 (Rab.)
 Daleas, P., 544 (Z.)
 Dalma, G. & Tuchtan, D., 605 (Mal.)
 Dany, G., 381 (Pl.)
 Dany, H., 874 (Pl.)
 Das, K. K., (692) (Hel.)
 Dassen, R. & Rey, J. C., (241) (Hel.)
 Datta, S., 207 (Hel.)
 Dau, H., with Pijper, 101, 636 (Fev.)
 Daukes, S. H., 26 (Misc.)
 David, N. A. & Leake, C. D., 852 (Misc.)
 Davies, W. M., 527 (Z.)
 Davis, G. E., 719 (Y.F.)
 —, with Caldwell, F. C. & Caldwell, E. L., 222 (Hel.)
 Davis, L. J., 685 (Hel.), 921 (S.S.)
 Davis, N. C., 292, 717, 726 *bis*, 727 (Y.F.)
 —, with Burke, 289 (Y.F.)
 — & Shannon, R. C., 727 (Y.F.)
 Dawson, W. T., 816 (Hist.)
 — & Garbade, F. A., 62, 63 (Misc.)
 Day, H. B., 31 (Misc.)
 De, N., with Chopra, 267 (Am.)
 De, S. C., 101 (Fev.)
 Debono, J. E., with Zammit, 88 (Und.)
 Dechaume, J., with Paviot & Martin, 87 (Und.)
 Decourt, P., 999, (1031) (Mal.)
 —, with Tanon & Cambessédès, 1032 (Mal.)
 Deeks, W. E., 108, 120, 978 (Mal.)
 Degos, R., with Milian, (658) (Lep.)
 Deibel, H. K. & Elsbach, E. M., 930 (Y. & S.)

Deitrick, S., with Chu & Chung, 732 (R.F.)
 De la Camara, P., 1011 (Mal.)
 — & Moraleda, C., 601, 1011 (Mal.)
 De la Guardia, J., 420 (Myc.)
 Delanoë, E., 654 (Lep.)
 Delanoë, P., (241) (Hel.), 299, 300, 736 (R.F.), 449 (Y. & S.)
 Del Favero, E., 104 (Fev.)
 De Los Reyes, J. M., 456 (Bb.)
 Denham, A. A., 203 (Hel.)
 Deniel, with Sicé, Boisseau & Provost, 901 (S.S.)
 Denney, O. E., 323, (658) (Lep.)
 —, Hopkins, R. & Johansen, F. A., 327 (Lep.)
 Deplanche, 971 (Oph.)
 Deraniyagala, P. E. P., 540 (Z.)
 Desai, V. M., with Wilkinson, Stubbs & Beharilal, 988 (Mal.)
 Deschiens, R., 490 (Z.)
 — & Gourvil, E., 486 (Z.)
 —, with Troisier, 209 (Hel.)
 Des Essarts, J. Q., 535 (Z.)
 Devata-Soupramanien, with Labernadic, 172 (Hel.)
 Dévé, F., 676 (Hel.)
 Dey, N. C., (450) (Y & S)
 Dhar, D. R., 882 (Chl.)
 —, Dhar, H. & Adhyee, P. C., 436 (Chl.)
 Dhar, H., with Dhar, D. R. & Adhyee, 436 (Chl.)
 Dhunjibhoy, J. E., 58 (Misc.)
 Dhur-Roy, J. & Rakshit, A., (658) (Lep.)
 Diamantopoulos, J., (622) (Fev.)
 Dias, E., 379 (S.S.)
 Dickens, P. F., (866) (Misc.)
 Di Domizio, G., 369 (S.S.)
 Dikshit, B. B. & Row, R. S. T. M., 959 (Lep.)
 Diliberto, U., 1014 (Mal.)
 Dilling, W. J., with Sadler & Gemmell, 848 (Misc.)
 Di Lullo, O., 408 (Der.)
 Dimitry, T. J., 654 (Lep.)
 Di Natale, A., (611) (Mal.)
 Dinger, J. E., 722 (Y.F.)
 —, Schüffner, W. A. P. & Snijders, E. P., 291, 295 (Y.F.)
 —, with — & —, 718 (Y.F.)
 —, —, — & Swellengrebel, N. H., 290, 725 (Y.F.)
 —, with Snijders, 728 (Y.F.)
 — & Verschaffelt, F., 314 (Lept.)
 Dios, R. L. & Nopoff, R., 534 (Z.)
 Dischamps, A., with Curasson, 742 (Rab.)
 Dixey, M. B. D., (241) (Hel.), 650 (Lep.)
 Dixon, D. S., with Low, 50 (Misc.)
 Dobell, C., 705 (Z.)
 Doerr, R. & Schmidt, G. W., 208 (Hel.)
 Doggart, J. H. & Shapland, C. D., 969 (Oph.)
 Dominici, A., 376 (S.S.)
 — & Rocca, G. C., 145 (Mal.)
 Donatien, A., with Parrot & Lestoquard, 157 (K.A.)
 van Doninck, A., 821 (Hist.)
 Dormal, V. J., with Andrews & Johnson, 372 (S.S.)
 Dorolle, 1000 (Mal.)
 Dostrowsky, A., (648) (K.A.)
 Doubrow, S. & Rousset, J., 234 *bis* (Hel.)

Douglass, M., with McKinley, 508 (Z.)
 Dowling, G. B., with Ashford, 73 (Misc.)
 —, with — & McKinley, 425 (Myc.)
 Drake-Brockman, R. E., (801) (Am.)
 Drenowsky, A. K., 1009 (Mal.)
 Du, S. D., 199 (Hel.)
 Dubois, A., 735 (R.F.), 907, 922 (S.S.)
 Dubois, C. & Sollier, N., 87, 704 (Und.)
 Dufosse, 226 (Hel.)
 Duggan, J. N. & Nanavati, B. P., 479 (Oph.)
 Duguid, C., (658) (Lep.)
 Duke, H. L., 346, 347, 896 (S.S.)
 — & Wallace, J. M., 365 (S.S.)
 Dumont, P., with Van den Branden & Nélis,
 305 (R.F.), 900 (S.S.)
 Dunbar, L. & Stephens, E. D., 276 (Dys.)
 Dunn, with Anderson, 381 (Pl.)
 Dunn, L. H., with Clark, 494 (Z.), 978 (Mal.)
 Dupas, J., 451 (C.Bu.)
 Dupont, A., 160 (K.A.)
 Dupuy, H., 243 (Rab.)
 Durand, G., 210 (Hel.)
 Durand, P., 629 (Fev.), 876 (Pl.)
 — & Conseil, E., 98 (Fev.)
 —, with — (395) (Pl.)
 Duren, A. N., (296) (Y.F.)
 Durieux, C., with Mathis, 303, 735 (R.F.)
 Du Toit, J. A., (241) (Hel.)
 Du Toit, P. J., 742 (Rab.)
 Dutrey, with Codvelle & Jausion, 349 (S.S.)
 Dwijkoff, P. P., 328 (Lep.)
 Dychitan, T., 861 (Misc.)

E

Eales, N. B., 199 (Hel.)
 Earle, W. C., 114 (Mal.)
 Ebert, M. K., 4 (Bl.)
 Edwards, F. W., 509 (Z.)
 Eguchi, S. & Nishiyama, I., 203 (Hel.)
 Egypt, 480, 972 (Oph.)
 Ehara, I., with Minami, 215 (Hel.)
 Ehrmann, R., (147) (Mal.)
 Eichhorn, M., (692) (Hel.)
 El-Dalgamony, A., with Ali, 962 (Lep.)
 El Din, M. S., with Hassan, 181 (Hel.)
 El-Kattan, M. A., 480, 967 (Oph.)
 El Khani, 159 (K.A.)
 Ellenbogen, V., 236 (Hel.)
 Ellingworth, S., with Browning, Cohen & Gul-
 bransen, R., 925 (S.S.)
 Elliot, R. H., 478 (Oph.)
 Elsbach, E. M., with Deibel, 930 (Y. & S.)
 Emck, W. F., 822 (Hist.)
 Emery, F. E. & Herrick, C. A., 224 (Hel.)
 d'Engel, R., with Jancsó, 990, 998 (Mal.)
 Epstein, D., 848 (Misc.)
 Eskey, C. R., 871 (Pl.)
 Esquier, G., (147) (Mal.)
 Essed, W. F. R., (438) (Chl.)
 Essex, H. E. & Bollman, J. L., (241) (Hel.)
 —, Markowitz, J. & Mann, F. C., 542 (Z.)
 Eubanas, F., 329 (Lep.)
 Evans, A. M., (552) (Z.)
 Eyermann, C. H. & Strauss, A. E., 133 (Mal.)
 Eyre, J. W. H., 83 (B.R.)

F

Fabre, R., with Binet, 847 (Misc.)
 Facio, L., 410 (Der.)
 Fairley, K. D., 8 (Bl.)
 Fairley, N. H., 679 (Hel.)
 —, with Low, 290 (Y.F.)
 —, Mackie, F. P. & Jasudasan, F., 196 (Hel.)
 Falcão, E. de C., (241) (Hel.), 432 (Chl.), 477
 (Oph.)
 Far Eastern Association of Tropical Medicine,
 169 (Hel.)
 Farmakidis, C., (280) (Dys.), 787 (Am.), (878)
 (Pl.)
 Fast, G., 930 (Y. & S.)
 Faust, E. C., 198, 689, 690 (Hel.), 268 (Am.),
 538 (Z.), 784 (Am.)
 —, with Kagy, 793 (Am.)
 — & Kellogg, C. R., 171 (Hel.)
 Fawcett, H. A., 531 (Z.)
 Federated Malay States, 111, 985 (Mal.), 561
 (Lab.)
 Feegrade, E. S., 82 *bis* (Misc.)
 Feemster, R., with Silverman, 797 (Dys.)
 Feldmann, I., 208 (Hel.)
 Feliciano, R. T., with Vedder, (464) (Bb.)
 Feng, L. C., 667 (Hel.)
 Feng, S. T., with Curran, 538 (Z.)
 Ferradas, M. G., 1013 (Mal.)
 Ferreira, A. A. & Conte, H. S. V., 748 (Rab.)
 Ferrell, J. A., 991 (Mal.)
 de Figueiredo, J. M. P., 382 (Pl.)
 Findlay, G. M., 31 (Misc.)
 — & Hindle, E., 293 (Y.F.)
 Finkelstein, M. H., 884 (Chl.)
 Fischer, I. A., 309 (Lept.)
 Fischer, O., 349 (S.S.)
 Fischer, W. O., 405 (Der.)
 Fishback, H. R., 225 (Hel.)
 Fittipaldi, C., 490 (Z.)
 Flatow, E., 823 (Hist.)
 Fleming, N., 969 (Oph.)
 Fletcher, W., 94 (Fev.)
 Foley, H., with Joyeux, 202 (Hel.)
 —, with Sergeant, Edm., Sergeant, Et.,
 Parrot, Catanei & Senevet, 984 (Mal.)
 Fonquernie, J., 383, 875 (Pl.)
 da Fonseca, F., with Pinto, 527 (Z.)
 da Fonseca, O., 400 (Der.)
 — & Levy, A. S., 399 (Der.)
 da [Fonseca, O., Jr., (415 *bis*) (Der.), (1031)
 (Mal.)
 — & Leão, A. E. de A., 404 (Der.)
 — & da Rosa, A. F., 401 (Der.)
 Fontoynt, M., Girard, G. & Woltz, H., 935
 (Y. & S.)
 Forbes-Brown, A., 839 (Misc.)
 Forbes, J., 12 (Bl.)
 Fornara, with Arnaud, Vigoni & van Hoof,
 932 (Y. & S.)
 Forsyth, W. L. & Gohar, M. A., 310 (Lept.)
 Fort, M. A., 774 (Misc.)
 Fotheringham, W. T., with Ruiz, 452 (C.Bu.)
 Found, N., 19 (Misc.)
 Fournau, E., Tréfouel, M. & Mme. & Benoit,
 G., 64 (Misc.)
 —, —, Stefanopoulou, G., Benoit, G., de
 Lestrangle, Y. & Melville, K. I., 64 (Misc.)
 Fowler, J. K., 286 (Y.F.)

Fox, H., 396 (Der.), 648 (K.A.)
 Foy, H. A., 887 (H.S.)
 Fradkin, W. Z. & Schwartz, L. S., 41 (Misc.)
 Fraga, A., 398 (Der.)
 Fraga, C., et al, 714 (Y.F.)
 France: Ministère de la Guerre, 869 (B.R.)
 Franchini, G., 116, (147) (Mal.), 298 (R.F.)
 — & Pirami, E., 643 (K.A.)
 — & Taddia, L., 732 (R.F.)
 Francisco, S. A., with Tubangui, 199 (Hel.)
 Franco, E. E., 58 (Misc.)
 — & Manai, A., 149 (K.A.)
 Frank, A. W., (147) (Mal.)
 Franke, M., with Ciuca, Irimesco, Ballif, Constantinesco & Vieru, 136 (Mal.)
 Frazier, C. N., Kurotchkin, T. J. & Mu, J., 418 (Myc.)
 Freed, H., with Gallagher, (866) (Misc.)
 Freeman, H., with Ingall, 203 (Hel.)
 Frégonneau, W., 113 (Mal.)
 Frei, W. & Wiese, J., 937 (C.Bu.)
 de Freitas, O., 256 (Rab.)
 Freudenthal, W., 452 (C.Bu.)
 Freyd, A., 23 (Misc.)
 Frobisher, M., Jr., 720 *bis*, 721 (Y.F.)
 Fróes, H. P., 694 (B.R.)
 Fülleborn, F., 235, 236 (Hel.)
 — & Kikuth, W., 234 (Hel.)
 Fullerton, H. R., 1027 (Mal.)
 Fulmer, E. I., with Buchanan, 168 (B.R.)
 Fuse, S., 409 (Der.)

G

Gabbi, U. & Mariotti-Bianchi, 26 (Misc.)
 Gadaud, with Louste & Lévy-Franckel, (658) (Lep.)
 Gaisky, N., 393, 877 (Pl.)
 Gaitan, L., 282 (Y.F.)
 Gallagher, E. T. & Freed, H., (866) (Misc.)
 Gallea, M., 249 (Rab.)
 Gambia, 543 (Z.)
 Gambier, 195 (Hel.)
 Gambier, A., 39 (Misc.), 172 (Hel.), 264 (Am.) (415) (Der.)
 Ganora, R., 24, 69 (Misc.), (147) (Mal.)
 Garbade, F. A., with Dawson, 62, 63 (Misc.)
 Garcia Maldonado, L., 452 (C.Bu.)
 Garcia de Obeso, L., 769 (Misc.)
 Garcia, O., with Schöbl, 443 (Y. & S.)
 Gardner, G., 1035 (B.R.)
 Gardner, L., with Starr, 663 (Sp.)
 Garin, C., Rousset, J. & Gonthier, B., 233 (Hel.)
 Garnham, P. C. C., 995, 1020 (Mal.)
 Garnier, M., Nicaud, P. & Mausler, A., (740) (Lept.)
 Garrido Morales, E., with Costa Mandry, 795 (Dys.)
 Garry, G., 407 (Der.)
 Gasca, A., 764 (Misc.)
 Gasperini, C. G., 162, 645 (K.A.)
 Gater, B. A. R., 610 (Mal.), 834 (Misc.)
 Gatowskaja, R. G. & Kasakoff, P. T., 208 (Hel.)
 Gautier, R., 437, 879 (Chl.)
 Gay, D. M. & Bigelow, J. B., 402 (Der.)

Gebeili, E., (878) (Pl.)
 Geiger, A., Kligler, I. J. & Comaroff, R., 374 (S.S.)
 —, with — & —, 376 (S.S.)
 Geiger, J. C. & Gray, J. P., (1031) (Mal.)
 Gelli, G., with Giordano, 182 (Hel.)
 Gemmell, A. A., with Sadler & Dilling, 848 (Misc.)
 Geneeskundig Tijdschrift voor Nederlandsch-Indië, 563 *bis*, 564 (Lab.)
 de Gentile, O. R., with Weiss & Conseil, 966 (Oph.)
 George, I. D., 546 (Z.)
 Georgi, F. & Beyer, A., 467 (Pel.)
 Gerbasi, M., 786, (801) (Am.)
 Gerber, C. W., 991 (Mal.)
 Gessner, O., (280) (Dys.)
 Gesteira, M., 130 (Mal.)
 Gharpuré, P. V., 156 (K.A.)
 — & Saldanha, J. L., 783 (Am.)
 Gheorghiu, I., 279 (Dys.)
 Ghosh, B. N., 779 (B.R.)
 Giemsa, 60 (Misc.), 357 (S.S.)
 — & Jirovec, O., 912 (S.S.)
 Gighoh, G., 42 (Misc.), 131 (Mal.), 454 (G.V.)
 Gilder, W., with Makel, 12 (Bl.)
 Gilks, 134 (Mal.)
 Gill, C. A., 106, 996 (Mal.)
 — & Lal, R. B., 879 (Chl.)
 Gillispie, A. M., 951 (Bl.)
 Gilmour, C. C. B., 856 (Misc.)
 Gingold, N., with Nicolau, 998 (Mal.)
 Giordano, M. & Gelli, G., 182 (Hel.)
 —, with Cesarano, (552) (Z.)
 Girard, G., 386, 878 (Pl.)
 —, with Fontoynt & Woltz, 935 (Y. & S.)
 — & Hérivaux, A., 653 (Lep.)
 Giraud-Costa, E., 627 (Fev.)
 Girges, R., 195 *bis*, (241) (Hel.)
 Girolamo, L., 31 (Misc.)
 Glaubersohn, S. A. & Goldenberg, M. M., 471 (Pel.)
 Glover, W. E. & Connal, A., 8 (Bl.)
 Glusman, M. P. & Goldenberg, J. I., 256 (Rab.)
 —, Sadowjsky, I. J. & Solowjewa, J. W., 244 (Rab.)
 — & Solowjewa, J. W., 746 (Rab.)
 —, Solowjewa, J. W. & Predtetschenskaja, L. A., 244 (Rab.)
 Godoy, A., Lobo, A. & Cruz, O., Jr., 586 (Mal.)
 Gohar, M. A., 960 (Lep.)
 —, with Forsyth, 310 (Lept.)
 Goiran, E., with Blanc, (1031) (Mal.)
 Goldberger, J. & Sebrell, W. H., 473 (Pel.)
 —, Wheeler, G. A., Rogers, L. M. & Sebrell, W. H., 473 (Pel.)
 Golden, R., with O'Connor & Auchincloss, (692) (Hel.)
 Goldenberg, I., with Zuwerkallow, 246 (Rab.)
 Goldenberg, J. I., with Glusman, 256 (Rab.)
 Goldenberg, M. M., with Glaubersohn, 471 (Pel.)
 Goldina, R. B., with Gubin, 247 (Rab.)
 Golov, D. & Kniazewsky, A., 393 (Pl.)
 Golovine, S., 673 (Hel.)
 Golow, D. & Knjasewskii, A., 383 (Pl.)
 Golubewa, E. E., with Rubinstein, 70 (Misc.)
 Gomes, J. M., 961 (Lep.)
 Gomez, L. B., 331 (Lep.)

Gomila, F. R., 388 (Pl.)
 Gonthier, B., with Garin & Rousset, 233 (Hel.)
 Gonzalez, H. E., Ontaneda, L. E. & Vidaurreta, M., 162 (K.A.)
 Goodale, R. H., 676 (Hel.)
 — & Krischner, H., 210 (Hel.)
 Goodner, K. & Shattuck, G. C., 773 (Misc.)
 —, with Shattuck, 447 (Y. & S.)
 Goodson, J. A. & Henry, T. A., 61 *bis* (Misc.)
 —, & Macfie, J. W. S., 849 (Misc.)
 Goodwin, T. S., 184 (Hel.)
 Gool, A. H., 768 (Misc.)
 Gopsill, W. L., 173, 188 (Hel.)
 Gordon, R. M., 70 (Misc.)
 — & Hicks, E. P., 192 (Hel.)
 Gosio, R., 1031 (Mal.)
 Götz, G., with Schander, 835 *bis* (Misc.)
 Goubarev, E. & Lipatova, T., 877 (Pl.)
 Gougerot & Aubin, 324 (Lep.)
 Gourevitsch, D., 490 (Z.)
 Gourmelon, (13) (Bl.)
 Gourvil, 786 (Am.)
 Gourvil, E., with Deschiens, 486 (Z.)
 Gover, W., 662 (Sp.)
 Goyle, A. N., with Taylor, 739 (Lept.)
 Grabow, C., with Plaut, 301 (R.F.)
 Gracias, J. B. A., 810 (Hist.)
 Gradwohl, R. B. H., 71 (Misc.)
 Graham, G. M., with Weller, 299 (R.F.)
 Graham, J. D., 381 *bis* (Pl.), 431, 883 (Chl.)
 Graham, J. W., 38 (Misc.)
 Graham-Smith, G. S., 527 (Z.)
 Grant, F., 200 (Hel.)
 Grant, P. F. A., with Thompson, 121 (Mal.)
 Gratch, I., 115 (Mal.)
 Graterol y Morles, J., (464) (Bb.)
 Gray, G. M., 48 (Misc.)
 Gray, J. P., with Geiger, (1031) (Mal.)
 Green, R., 143 (Mal.)
 Green-Armytage, V. B., 831 (Hist.)
 Greenway, D. & Croce, C., (552) (Z.)
 Greer, A. E., 469 (Pel.)
 Greig, D. M., 545 (Z.), 753 (Rab.)
 Greval, S. D. S., with Taylor & Thant, 273 (Dys.)
 Grey, J. C. P., 231 (Hel.)
 Griffiths-Jones, E., Atkinson, H. & Hassan, A., 668 (Hel.)
 Griffiths, T. H. D., 108 (Mal.)
 Grigorowa, O. & Nesturch, M., 218 (Hel.)
 Grinker, R. R., 749 (Rab.)
 —, with Bassoe, 245 (Rab.)
 Gritzai, P. K., 513 (Z.)
 Gron, K., 334 (B. R.)
 Gros, H., 830 (Hist.)
 Grünbaum, F. T., with Kritschewski & Schapiro, 854 (Misc.)
 Gualdi, A., 150 (K. A.)
 Guardia, G. T., 52 (Misc.)
 Gubin, W. M. & Goldina, R. B., 247 (Rab.)
 Gueliadow, N. B., 138 (Mal.)
 Guerricchio, A., 165 (K.A.)
 Gulbransen, R., with Browning, Cohen & Ellingworth, 925 (S.S.)
 Gulino, M., 626 (Fev.)
 Gupta, B. M. D., 154, 163, 646 (K.A.), 595 (Mal.)
 —, with Knowles, 129, 588 (Mal.)
 Gupta, C. R. D., with Napier, 160 (K.A.)

Gupta, D., with Knowles & White, (611) (Mal.)
 Guthrie, R. H., 470 (Pel.)
 Gutteridge, N. M., with Crawford, 662 (Sp.)
 Guy, R., (1032) (Mal.)

H

Haberfeld, W., (866) (Misc.)
 Hackett, L. W., 124, 976 (Mal.)
 — & Missiroli, A., 569 (Mal.)
 van Haeften, J., with Hamilton & Basu, 886 (H.S.)
 Haga, J., 217 (Hel.)
 —, with Brug, 536 (Z.)
 Hakim, A., 993 (Mal.)
 Hakki, I., 176 (Hel.)
 Hakushi, R., with Koidzumi, (552) (Z.)
 Halawani, A., 268 (Am.)
 Haldar, K. C., with Napier, 161 (K.A.)
 Hall, M. C., 177 *bis* (Hel.)
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 London, J., 274 (Dys.)
 Long, J. D., 382 (Pl.)
 Longo, D., 113 (Mal.)
 van Loon, F. H. G., 864 (Misc.)
 Lopez, J. A., 81 (Misc.)
 Lopez Nussa, E., 845 (Misc.)
 Lo Presti-Seminario, F., 645 (K.A.)
 Loram, C. T., 766 (Misc.)
 Lorando, N. & Chanotis, N., 615 (Fev.)
 Lorando, N. I., 132 (Mal.)
 Lorando, W. J., (611) (Mal.)
 v. Löte, J., 743 (Rab.)
 Lotze, H., (552) (Z.)
 Loucks, H. H., 204 (Hel.)
 Lourie, E. M., 908 (S.S.)
 —, with Adler & Theodor, 516 (Z.)
 Louste, Lévy-Francckel & Gadaud, (658) (Lep.)
 Low, G. C., 47 (Misc.), 450 (C.Bu.)
 — & Cook, A. B., (866) (Misc.)
 — & Dixon, D. S., 50 (Misc.)
 — & Fairley, N. H., 290 (Y.F.)
 Loygue & Lemoine, (740) (Lept.)
 Iubieniecki, H., 689 (Hel.)
 de Luca, B., 130 (Mal.)
 Lucca, A., 164 (K.A.)
 Luckner, J. T., with Africa, 691 (Hel.)
 Luigi, F. J., 645 (K.A.)
 Lukis, P. & Blackham, R. J., 869 (B.R.)
 Lull, G. F., 885 (Chl.)
 Luna, J. D., with Mazza, 165 (K.A.)
 Lutrario, 125 (Mal.)
 Lutz, A., 282 (Y.F.)
 Lutz, H., 202 (Hel.)
 Lutz, J. R., with Bassler, 660 (Sp.)
 Lynch, K. M., 428 (B.R.)

M

- Maass, E. & Vogel, H., 194 (Hel.)
 MacArthur, W. P., 209 (Hel.)
 MacCallan, A. F., 965, 967 (Oph.)
 McCarthy, D. D., 21 (Misc.)
 M'Cluskie, J. A. W., 317 (R.B.F.)
 McCord, J. B., 766 (Misc.)
 McCoy, G. W., 252 (Rab.)
 McCoy, O. R., 238 (Hel.)
 McCulloch, W. E., 555 (Lab.)
 McDaniel, J. C., with Nutter, 978 (Mal.)
 Macdonald, G., 995 (Mal.)
 — & Chowdhury, K. L., 987 (Mal.)

- McDowall, R. J. S., 432 (Chl.)
 McFadyen, A. A., 638 (K.A.)
 MacFadyen, J. A., 271 (Am.)
 Macfie, J. W. S., with Goodson & Henry, 849 (Misc.)
 McGolrick, L., 844 (Misc.)
 MacGregor, M. E., 504 (Z.)
 McGusty, V. W. T., 400 (Der.)
 Machattie, C., with Mills & Chadwick, 158 (K.A.)
 Maciel, H., 454 (G.V.), 670 (Hel.)
 McKendrick, A. G., 247 (Rab.)
 McKenzie, A., 465 (Pel.)
 Mackie, F. P., 45 (Misc.)
 —, with Fairley & Jasudasan, 196 (Hel.)
 McKie, M., with Burnet & Wood, 273 (Dys.)
 McKinley, E. B., with Ashford & Dowling, 425 (Myc.)
 — & Douglass, M., 508 (Z.)
 —, with Scott, 425 (Myc.)
 Mackinnon, M., 35 (Misc.)
 Maclean, G., 342, 343 (S.S.)
 McLean, N., 122 (Mal.)
 MacMahon, H. E. & Weiss, S., 66 (Misc.)
 Macphail, N. P., 106, 978 (Mal.)
 Madras, 971 (Oph.)
 Maeji, Y., (801) (Am.)
 Magalhaes, A. de G., 728 (Y.F.)
 de Magalhães, O., 419 (Myc.)
 Mahadevan, V. & Raman, T. K., 455 (Bb.)
 Mahaffy, A. F., with Beeuwkes & Bauer, 283 (Y.F.)
 Mahlangeni, 768 (Misc.)
 Maisler, A., with Garnier & Nicaud, (740) (Lept.)
 Maitra, G. C., with Tomb, 885 (Chl.)
 Majumdar, A. R., 336 (B.R.)
 Makel, H.P., 413 (Der.)
 — & Gilder, W., 12 (Bl.)
 — & de Vault, V. T., 221 (Hel.)
 Malaguti, A., 87 (Und.)
 Malaret, P. S., 107 (Mal.)
 Malaria-Commissie uit den Gezondheidsraad, 116 (Mal.)
 Malayan Medical Journal, 1028 (Mal.)
 Maldonado Maldonado, A., 682 (Hel.)
 Mallick, S. M. K., with Ahuja, 332 (Lep.)
 Malone, R. H., with Asheshov, Taylor, Morison & Iyengar, 863 (Misc.)
 Maltsberger, J. R., 107, 978 (Mal.)
 Manai, A., with Franco, 149 (K.A.)
 Manalang, C., 146, 587 (Mal.), 495, 512 (Z.)
 Manca, S., 999 (Mal.)
 Mandoul, H., (395) (Pl.)
 Mandry, O. C., (280) (Dys.)
 Mangiola, M., 687 (Hel.)
 Manifold, J. A., 840 (Misc.), 1007 (Mal.)
 Mann, F. C., with Essex & Markowitz, 542 (Z.)
 Manoussakis, E., 64 (Misc.), 619 (Fev.)
 Mansell, R. A., 987 (Mal.)
 Manson-Bahr, P., 8 (Bl.), 47 (Misc.), 925 (S.S.), 1005, 1010 (Mal.)
 Manteufel, P. & Herzberg, K., 729 (Y.F.)
 — & Taute, M., 427 (B.R.)
 Manwell, R. D., 600 (Mal.)
 Maplestone, P. A., 204, 207, 230 (Hel.)
 Marcandier & Bideau, 97 (Fev.)
 Marcandier, A., with Plazy, 624 (Fev.)
 Marchiava, E., 587 (Mal.)
 Marchoux, E., 852 (Misc.)
 — & Chorine, V., 495 bis (Z.), 738 (R.F.)
 —, Markianos, J. & Chorine, V., 656 (Lep.)
 Marçon, L. & Marçon, H., 631 (Fev.)
 Marie, A. C. & Urbain, A., 256, 746 (Rab.)
 Mariotti-Bianchi, with Gabbi, 26 (Misc.)
 Markianos, J., 652, 657 (Lep.)
 —, with Marchoux & Chorine, 656 (Lep.)
 Markowitz, J., with Essex & Mann, 542 (Z.)
 Markowski, S., with Legezynski, 256 (Rab.)
 Marmo, A., (307) (R.F.), 860 (Misc.)
 Marmorston-Gottesman, J., with Perla, 492 (Z.)
 —, — & Vorzimer, J., 492 (Z.)
 Marone & Tessitore, C., 845 (Misc.)
 de Marquessac, 345 (S.S.)
 Marques, A., 237 (Hel.)
 Marsh, F., 888 (H.S.)
 Marshall, M. S. & Jared, D., 89 (Und.)
 Martin, with Letonturier & Souchard, 40 (Misc.)
 Martin, C. J., 888 (H.S.)
 Martin, J. F., with Paviot & Dechaume, 87 (Und.)
 Martin, D. L., 270 (Am.)
 Martínez Vinuesa, J. J., 385 (Pl.)
 Martini, E., 500 (Z.)
 — & Achundow, I., 508 (Z.)
 Marzinowsky, E. I., 620 (Fev.)
 Masen, J. M., with Vedder, 1002 (Mal.)
 Mason, M., 169 (B.R.)
 Masselot, F., 699 (Und.)
 Massia, G., with Nicolas & Weigert, (658) (Lep.)
 Massias, C., 135 (Mal.), 528 (Z.)
 Masslow, A. W., 513 (Z.)
 Massoud, F., 480 (Oph.)
 Mata Merchán, M. & Mata Merchán, J., 645 (K.A.)
 Mathieu, 682 (Hel.), 951 (Bl.)
 Mathue, H., 12 (Bl.)
 Mathis, C. & Durieux, C., 303, 735 (R.F.)
 Matossi, R., 223 (Hel.)
 Matsuura, T., with Morishita, Namikawa & Tanikawa, (1032) (Mal.)
 Mattei, C., 789 (Am.)
 di Mattei, G., 82 (Misc.)
 Maurice, G. K., 343, 379 (S.S.)
 Maxwell, J. L., 673 (Hel.)
 Maxwell, J. S., (147) (Mal.)
 Mayer, T. F. G., 320 bis (Lep.)
 Mazet, M., 627 (Fev.)
 Mazza, S., 305 (R.F.), 483 (Z.)
 — & Luna, J. D., 165 (K.A.)
 —, Romaña, C. & Schürmann, K., 923 (S.S.)
 Medulla, C., 93, 99 (Fev.), (147) (Mal.), 701 (Und.), 732 (R.F.)
 Megaw, J. W. B., 31 (Misc.)
 Megaw, J. W. D., 623 (Fev.)
 de Meillon, B., 514 (Z.)
 Mélanidi, C. & Stylianopoulou, M., 617 (Fev.)
 Mello, A. da S., (280) (Dys.)
 de Mello, F., (147) (Mal.), 809 (Hist.)
 —, Brás de Sá, L. J. & d'Abreu, M., 1008 (Mal.)
 de Mello, I. F., 955 (Lep.)
 Melnotte, P., 594 (Mal.)
 Melville, K. L., with Fourneau, Tréfouel, M. & Mme, Stefanopoulou, Benoit & de Lestrangle, 64 (Misc.)

- Menaut, 960 (Lep.)
Mendelson, R. W. & Beam, M. P., 662 (Sp.)
Mendis, J. C., with Richmond, 105 (Mal.)
de Mendonça, F. C., 799 (Dys.)
Menk, W., 733 (R.F.)
Mennonna, G., 799 (Dys.)
Menon, K. N., with Taylor, 248 (Rab.)
Menon, K. P., with King, Pandit & Iyer, 211 (Hel.)
Menon, T. B., 279 (Dys.)
Mer, G., with Kligler, 589, 599, 1008 (Mal.)
Mertens, W. K., 621 (Fev.)
Merzbacher, L., 118 (Mal.)
Mesnard, J. & Bordes, L. A., 580 (Mal.)
— & Morin, H., 1019 (Mal.)
Mesnil, F., 379 (S.S.)
Messimy, R., 412 (Der.)
Mestre, I. J., with Castello, 414 (Der.)
Metz, M., 881 (Chl.)
Meyer, J., with Sartory & Meyer, M., 424 (Myc.)
Meyerhof, M., 480 (Oph.)
Meyers, F. M., 844 (Misc.)
Mhaskar, K. S. & Caius, J. F., 68 (Misc.)
—, with — & Isaacs, 68 (Misc.)
Michailow, S., with Latko, 938 (C.Bu.)
Michel, R., with Bailly, 257 (Rab.)
Micheletti, E., 133 (Mal.)
Middleton, W. S., 819 (Hist.)
de Migho, U., (611) (Mal.)
Miguens, with van Nitsen, Lejeune, Serra & Van den Branden, 439 (Y. & S.)
Miguens, J., 440 (Y. & S.)
Mikaelian, R. C., 968 (Oph.)
Milani, C., with Cuboni, (1031) (Mal.)
Milhaud, with Piéry, 26 (Misc.)
Milian & Degos, R., (658) (Lep.)
Milio, G., 164 (K.A.)
Miller, H. M., Jr., 205, 679 (Hel.)
Miller, J. W., 922 (S.S.)
—, with d'Aunoy, 251 (Rab.)
Milliken, G., with Chandler & Schuhardt, 217 (Hel.)
Mills, E. A. & Machattie, C., with Chadwick, C. R., 158 (K.A.)
Minami, S. & Ehara, I., 215 (Hel.)
— & Sato, T., 183 (Hel.)
Minervin, S. M., 882 (Chl.)
Mirra, G., (13) (Bl.)
Mirza, M. B., 221 (Hel.)
Missiroli, A., 607, 609 (Mal.), 835 (Misc.)
—, with Hackett, 569 (Mal.)
Mitamura, T., with Nagayo, Tamiya & Sato, 635 (Fev.)
Mitchell, J. A., with Pirie, J. H. H., Rhodes, W. F. & Powell, W., 391 (Pl.)
Mittra, S., (692) (Hel.)
Miyagawa, Y. & Okada, R., 238 (Hel.)
Miyajima, M., 536 *bis* (Z.)
Miyamoto, S., 509 (Z.)
Miyao, I., 446 *ter*, 448 (Y. & S.)
—, with Hasselmann, 413 (Der.)
—, with Schöbl & Tanabe, 443 (Y. & S.)
Miyoshi, S., with Tōyama & Kubokawa, 332 (Lep.)
Mizushima, H., with Tsuchiya, 488 (Z.)
Mochkovski, C., 996 (Mal.)
Mochtar, A., 319 (R.B.F.)
Moeller, J., 763 (Misc.)
Mohammed, A. S., 669, (692) (Hel.)
Molinelli, E. A. & Ré, P. M., 332 (Lep.)
Mollow, W., 205 (Hel.)
Moltschanow, S. A., with Burowa, 154 (K.A.)
Momma, K., 209 (Hel.)
Monaldi, T. de S., with Ninni, 963 (Lep.)
Moncarey, 11 (Bl.)
Monier, H. M., 1012 *quat.* (Mal.)
Monier, H., with Lavergne, 1022 (Mal.)
Monteiro, J. L., 724 (Y.F.)
Monteleone, R., 595 (Mal.)
Montgomery, H., 545 (Z.)
Moore, D. F., 38 (Misc.)
Moore, D. G. F., 478 (Oph.)
Moore, J. H., with Clemesha, 576 (Mal.)
Moore, J. J., 48 (Misc.)
Moraleta, C., with De la Camara, 601, 1011 (Mal.)
Morax & Nida, 968 (Oph.)
Morax, V., 476, 477, 968 (Oph.)
Moreau, 873 (Pl.)
Moretti, G., 226 (Hel.)
Morgan, E. L., 616 (Fev.)
Morgan, L. S., 638 (K.A.)
Morgan, O. G. & Lees, J. M., 479 (Oph.)
Morin, H., with Mesnard, 1019 (Mal.)
Morin, H. G. S., 112, 580, (1032), (Mal.)
Morishita, K., 498 (Z.), 1009 (Mal.)
— & Namikawa, H., 1010 (Mal.)
—, —, Matsuura, T. & Tanikawa, K., (1032) (Mal.)
—, with Oda & Namikawa, 1009 *bis* (Mal.)
Morrison, J., 560 (Lab.)
—, with Asheshov, Taylor, Malone & Iyengar, 863 (Misc.)
Morrell, C. A., with Wakeman, 13 (Bl.), 293, 722 (Y.F.)
Morrison, A., (878) (Pl.)
Morrison, H., 555 (Lab.)
Moufel, P. P., 120 (Mal.)
Mouillac, 771 (Misc.)
Mouquet, A., 449 (Y. & S.)
Mtschedlidse, I., with Kalandadse, 539 (Z.)
Mtschedlidzé, J., 674 (Hel.)
Mu, J., with Frazier & Kurotchkin, 418 (Myc.)
Mühlens, P., 594 (Mal.)
— & Knabe, K., 947 (Bl.)
—, with Nocht, (611) (Mal.)
Muir, E., 158 (K.A.), 958 (Lep.)
Mukherjee, S. C., 434 (Chl.)
Müller, H. R. & Stender, A., 191 (Hel.)
Mulligan, H. W., with Sinton, 146 (Mal.)
Munford, S. A., 467 (Pel.)
Murakawa, G., 916 *quin.* (S.S.)
Murat, with Audibert, 100 (Fev.)
Muratet, L. & Le Gac, P., 304 (R.F.)
Muraz, G., 352 (S.S.)
Murgatroyd, F., with Yorke, 350 (S.S.)
—, with — & Hawking, 909, 910 (S.S.)
—, with — & Owen, 1 (Bl.)
Murphy, R. A., (147) (Mal.)
Murugiah, C., 319 *bis* (R.B.F.)
Musger, 451 (C.Bu.)
Mynssen, G. E. H. V., 137 (Mal.)

N

- Nag, S. C., 65 (Misc.), 179 (Hel.)
Nagano, K., 169 (Hel.)

- Nagayo, M., Tamiya, T., Mitamura, T. & Sato, K., 635 (Fev.)
 Nagoya, T., 201 (Hel.)
 Nair, K. G. & Raju, S., (13) (Bl.)
 Naito, K., 691 (Hel.)
 Nájera, L., 355, 903, (925 bis) (S.S.)
 Nakajima, G., 276 (Dys.)
 Namikawa, H., (866) (Misc.)
 —, with Morishita, 1010 (Mal.)
 —, with —, Matsuura & Tanikawa, (1032) (Mal.)
 —, with Oda & Morishita, 1009 bis (Mal.)
 Nanavati, B. P., with Duggan, 479 (Oph.)
 Napier, L. E., 515 (Z.), 693 (B.R.)
 — & Gupta, C. R. D., 160 (K.A.)
 — & Haldar, K. C., 161 (K.A.)
 —, with Lloyd, 514 (Z.)
 Narayanin, C., with Labernadie, (438) (Chl.)
 Nash, T. A. M., 520 (Z.)
 Nattan-Larrier, L. & Noyer, B., 371 (S.S.)
 — & Richard, L., 874 (Pl.)
 Nature, 639 (K.A.)
 Nauck, E. G., (242) (Hel.)
 —, with Peña Chavarria, 54 (Misc.)
 Naumann, H. E., 936 (C.Bu.)
 Nayar, K. K., with Wright, 478 (Oph.)
 Nazareth, F. X. de S., 843 (Misc.)
 Neer, L. C., 748 (Rab.)
 Neff, E. A., 321 (Lep.)
 Negishi, K., (242) (Hel.)
 Négrié, with Le Chuiton, 703 (Und.)
 Neiva, C., 90 (Und.)
 Nélis, P., with Van den Branden & Dumont, 305 (R.F.), 900 (S.S.)
 Nelson, R. L., 271, 796 (Dys.)
 Neri, F., 145 (Mal.)
 Nesturch, M., with Grigorowa, 218 (Hel.)
 Neuber, E., 218 ter (Hel.)
 Neuda, P., (738) (R.F.)
 Neumann, C. Z., 150 (K.A.)
 Neumann, J., 967 (Oph.)
 Neveu, R., 607 (Mal.)
 Newell, W. G., with Kirby, 969 (Oph.)
 Nguyen-Duy-Ha, with Haslé, 138 (Mal.)
 —, with Normet & Hasle, 407 (Der.)
 Nicaud, P., with Garnier & Maisler, (740) (Lept.)
 Nicol, W. D., with James & Shute, 973 (Mal.)
 Nicolas, J., Massia, G. & Weigert, H., (658) (Lep.)
 Nicolau, C. T. & Gingold, N., 998 (Mal.)
 Nicolau, S. & Kopciowska, L., 247 bis (Rab.)
 —, Viala, J. & Kopciowska, L., 246 (Rab.)
 Nicolle, C., 538 (Z.)
 — & Anderson, C., 307, 731 (R.F.)
 —, — & Le Chuiton, F., 731 bis (R.F.)
 Nida, with Morax, 968 (Oph.)
 Nieschulz, O., 340 (B.R.)
 — & Hofkamp, H. S., 222 (Hel.)
 Nieuwenhuis, A. W., 986 (Mal.)
 Nigeria, 554, 555 ter (Lab.)
 Nikanorov, S., with Tikhomirova, 393 (Pl.)
 Nikolsky, A., 117 (Mal.)
 Ninni, C. & Monaldi, T. de S., 963 (Lep.)
 Nishimura, H., 387 (Pl.)
 —, with Ando & Kurauchi, 383 (Pl.)
 Nishiyama, I., 183 (Hel.)
 —, with Eguchi, 203 (Hel.)
 van Nitsen, R., 763 (Misc.), 929 (Y. & S.)
 —, Lejeune, E., Miguens, Serra, G. & Van den Branden, F., 439 (Y. & S.)
 Nitzulescu, J., with Puscariu, 968 (Oph.)
 Nocht, B., 4 (Bl.)
 — & Mühlens, P., (611) (Mal.)
 Nolasco, J. O., 328, 329, 959 (Lep.)
 Nöller, W., 781 (B.R.)
 Nopoff, R., with Dios, 534 (Z.)
 Normet, L., Hasle, G. & Nguyễn-Duy-Ha, 407 (Der.)
 Noronha, A. J., 497 (Z.)
 de Noronha, R., 1010 (Mal.)
 Norrie, F. H. B., 422 (Myc.)
 Norris, B., 1027 (Mal.)
 North, E. A., 333 (Lep.)
 Nossina, V., with Schourenkova, 497 (Z.)
 Noto-Soediro, R., (242) (Hel.)
 Nowosselsky, W. A., (866) (Misc.)
 Noyer, B., with Nattan-Larrier, 371 (S.S.)
 du Noyer, M. R., with Langeron, 696 (B.R.)
 Nudelman, M., 165 (K.A.)
 Nuttall, G. H. F., 534 (Z.)
 Nutter, R. B. & McDaniel, J. C., 978 (Mal.)
 Nyasaland Protectorate, 498 (Z.)
 Nye, L. J. J., 54 (Misc.)
- 0
- Ochi, S., 184 (Hel.)
 Ochoterena, I., 684 bis (Hel.)
 O'Connor, F. W., 681 (Hel.)
 —, Golden, R. & Auchincloss, H., (692) (Hel.)
 O'Connor, M. H., (740) (Lept.)
 Oda, T., Morishita, K. & Namikawa, H., 1009 bis (Mal.)
 Odessaer Medizinische Zeitschrift, 175 (Hel.)
 Odriosola, R., (552) (Z.)
 O'Farrell, W. R., 200 (Hel.)
 O'Flynn, J. A., (1032) (Mal.)
 Ogata, N., with Ishiware, 104 (Fev.)
 Ogawa, S., with Takahashi, Ishikawa & Ida, 467 (Pel.)
 Ohta, K., 458 (Bb.)
 — & Izumita, T., 459 (Bb.)
 Oiso, T., 240 (Hel.)
 Okada, R., with Miyagawa, 238 (Hel.)
 Okano, M., 179 (Hel.)
 Okonogi, T., 849 (Misc.)
 Olitsky, P. K., 476 (Oph.)
 —, Knutti, R. E. & Tyler, J. R., 966 (Oph.)
 — & Tyler, J. R., 965 (Oph.)
 Olmer, 99, 624 (Fev.)
 Olmer, D., 627 (Fev.)
 — & Olmer, J., 625 (Fev.)
 Olpp, G., 810 (Hist.)
 O'Malley, C. C., 478 (Oph.)
 Omar, A. R., 394 (Pl.)
 Onnizew, P., 1031 (Mal.)
 Onorato, R., 769 (Misc.)
 Onslow, D. V., 667 (Hel.)
 Onsy, A., 186 (Hel.)
 Ontaneda, L. E., with Gonzalez & Vidaurreta, 162 (K.A.)
 Oonvala, J. H., 837 (Misc.)
 O'Reilly, B. C. N., 440 (Y. & S.)
 Orenstein, A. J., 192 (Hel.), 766 (Misc.)

Orlowa, A. A. & Schachow, S. D., 514 (Z.)
 Orpen, L. J. J., 841 (Misc.)
 Osborne, C. J., with Holder & Sommermeyer, 791 (Am.)
 Osman, A. A., 34 (Misc.)
 Ota, M., 543 (Z.)
 — & Sato, S., 962 *bis* (Lep.)
 Otto, G. F., (242) (Hel.)
 — & Spindler, L. A., 174 (Hel.)
 Otto, R., 551 (Z.)
 Ottolenghi, D., 611 (Mal.)
 Ouchakov, V., 250 (Rab.)
 Owen, D. U., 642 (K.A.)
 —, with Yorke & Murgatroyd, 1 (Bl.)
 Owen, D. V., with Yorke, 606 (Mal.)
 Owtscharenko, E. P., 549 (Z.)
 Ozawa, M., 671 (Hel.)

P

Palawandow, H. B., 749 (Rab.)
 — & Serebrennaja, A. I., 741 (Rab.)
 — & Serebrjenaja, A. I., 245 *bis* (Rab.)
 Paldrock, A., 330, 654 *bis*, (658) (Lep.)
 Pallary, P., 544 (Z.)
 Palmerlee, C. A., 686 (Hel.)
 Palmowitch, S. M., with Remlinger & Bailly, 745 (Rab.)
 Pamboukis, G., 618 (Fev.)
 Pampana, E. J., 737 (R.F.)
 Panayotatou, A., 159 (K.A.), 421, 423 (Myc.), 787, 790 (Am.)
 Pandit, with Russell & King, 381 (Pl.)
 Pandit, C. G., with King, Menon & Iyer, 211 (Hel.)
 —, Pandit, S. R. & Iyer, P. V. S., (242) (Hel.)
 Paneth, O., 320, 959 (Lep.)
 de Paoli, P., 298 (R.F.), 407 (Der.), 751 (Rab.)
 Papaioannou, A., with Blanc & Joannides, 404 (Der.)
 Papanastasiou, E., (148) (Mal.)
 Papert, J. L., 526 (Z.)
 Paradiso, F., 154 (K.A.)
 Paradoksow, L. F., 175 (Hel.)
 Paras, E. M., 655 (Lep.)
 Pardo-Castello, V. & Caballero, G. M., 653 (Lep.)
 Parjono, Radsma, W. & Joenoes, M., 862 (Misc.)
 Parodi, S., 422 (Myc.)
 Parr, T., (242) (Hel.)
 Parrot, L., 517 (Z.)
 —, Donatien, A. & Lestoquard, F., 157 (K.A.)
 —, with Sergent, Edm., Sergent, Et., Foley, Catanei & Senevet, 984 (Mal.)
 Parsons, R. P., 807 (Hist.), 868 (B.R.)
 Pascheff, 476 (Oph.)
 Pastor Botija, F., with Lazaro Caballero, 164 (K.A.)
 Patané, C., 532 (Z.)
 Paterson, A. R., (148) (Mal.)
 Patriarca, M., (801) (Am.)
 Patton, C. R., 48 (Misc.)
 Paulson, M., with Andrews, 485 (Z.), 785 (Am.)
 Paviot, J., Martin, J. F. & Dechaume, J., 87 (Und.)

Pavlovsky, E. N., (552) (Z.)
 Pawan, J. L., 739 (Lept.), 1025 (Mal.)
 — & Camps-Campins, J., 863 (Misc.)
 Pawlowsky, E. N., 175 (Hel.)
 — & Stein, A. K., 534 (Z.)
 Pazienza, M., 405 (Der.)
 Pearce, L., 426 (B.R.)
 Pédaros, D., Caragianopoulos, G. & Valsamaki, A., 628 (Fev.)
 Pedro, A., with Vianna, 457 (Bb.)
 Peill, S. G., (242) (Hel.)
 Peirier, with Advier, 330 (Lep.)
 Peltier, 575, 975 (Mal.)
 Peña, R., 425 (Myc.)
 Peña Chavarria, A. & Nauck, E. G., 54 (Misc.)
 —, Serpa, R. & Bevier, G., 281 (Y.F.)
 Penington, R. G., 950 (Bl.)
 Penning, C. P. J., 822 (Hist.)
 Penso, G., 222, 687 (Hel.), 263, (801) *bis* (Am.)
 Penteado, J., with Vellard, 551 (Z.)
 Pereira, Jr., 423 *bis*, 425 (Myc.)
 Perepérez, F., 645 (K.A.)
 Péretz, H., 480, 969 (Oph.)
 Perez, M., 514 (Z.)
 Pergher, J., 900 (S.S.)
 Perla, D. & Marmorston-Gottesman, J., 492 (Z.)
 —, with — & Vorzimer, 492 (Z.)
 Perry, H. M., 276 (Dys.)
 Peruzzi, M., 800 *bis* (Dys.)
 Pessoa, S. B., 833 (Misc.)
 Peter, F. M., 187 (Hel.)
 Peterson, C. H., with Archer, 688 (Hel.)
 Petridis, P., (801) (Am.)
 Petrov, V. P., 94 (Fev.)
 Petrowsky, I. N., with Stradomsky, Popow & Rudnew, 142 (Mal.)
 Pettit, A., 716 (Y.F.)
 Petzetakis, 265, (801) (Am.)
 Peverelli, P., 96 (Fev.)
 Phelps, B. M., 107 (Mal.)
 Phelps, J. R., Smith, O. A., Carroll, H. H., Washburn, W. A. & Beagley, K. E., 215 (Hel.)
 Phulaire, 137 (Mal.)
 Philip, C. B., 292 (Y.F.)
 Philip, C. R., 585 (Mal.)
 Philippine Journal of Science, 649 (Lep.)
 Philpitschenko, A. A., 261 *bis* (Am.), (280) (Dys.)
 Phipson, E. S., 45 (Misc.)
 Phisalix, M., 752 (Rab.)
 Photakis, B. A., 394 (Pl.)
 Photinos, G. T., 161 (K.A.)
 Photinos, P. B., 646 (K.A.)
 Pichat, J., (296) (Y.F.)
 Pieri, J., with Boinet, 626 (Fev.)
 —, with Joyeux, 630 (Fev.)
 — & Raybaud, A., 627 (Fev.)
 Piéry & Milhaud, 26 (Misc.)
 Pijper, A. & Dau, H., 101, 636 (Fev.)
 Pikul, J., 156 (K.A.)
 Pinelli, L., 141 (Mal.)
 Pinto, C. & da Fonseca, F., 527 (Z.)
 Pinto, S. C. F., with de Andrade, (146) (Mal.)
 Pirami, E., with Franchini, 643 (K.A.)

Pirgialis, A., 628 (Fev.)
 Pirie, J. H. H., 391 (Pl.)
 Pirngadi, R., with Heinemann & Koumans, 30 (Misc.)
 Piot, R., 616 (Fev.)
 Plaut, F. & Grabow, C., 301 (R.F.)
 Plazy, 820 (Hist.)
 Plazy, L. & Marcandier, A., 624 (Fev.)
 Po, L. Y., with Levaditi, 305 (R.F.)
 Podjapolskaja, W. P., with Skrjabin, 675 (Hel.)
 Podjapolskaya, W. P., with — & Schichobalowa, 208 (Hel.)
 Podyapolskaya, B. P., with Scriabine & Stătirova, 182 (Hel.)
 Pontano, T., 620 (Fev.)
 Popoff, with Couvy, 386 (Pl.), 839 (Misc.)
 Popoff, S., with Assali, 385 (Pl.)
 Popow, W., 877 (Pl.)
 Popow, W. W., with Stradomsky, Petrowsky & Rudnew, 142 (Mal.)
 Pordon, A. A. C., 861 (Misc.)
 Porter, A., 232 (Hel.), 545 (Z)
 Portugal, H., 158 (K.A.)
 Postmus, S., (280) (Dys.)
 Poston, M. A., with Amoss, 89 (Und.)
 Pou, R. P., 307 (R.F.)
 Powell, A. T. W., 272 (Dys.)
 Powell, W., 391 (Pl.)
 Power, R. W. & Johnston, H. W., 226 (Hel.)
 Pozzi, A., 139 (Mal.)
 Pradhan, Y. M., 220 (Hel.)
 Prado, A. & Carvalho, A. E., 114 (Mal.)
 Pratti, 891 (S.S.)
 Prawirohardjo, R. S., (692) (Hel.)
 Prebil, M., (280) (Dys.)
 Predtetschenskaja, I. A., with Glusmann & Solowjowa, 244 (Rab.)
 Preyer, G., 318 (R.B.F.)
 Prieur, M., with Launoy, 362 *bis*, 906 (S.S.)
 Proceedings of the Celebration of the Three Hundredth Anniversary of the First Recognized Use of Cinchona, 1033 (B.R.)
 Proceedings of the Royal Society of Medicine, 31 (Misc.)
 Procter, R. A. W., 113 (Mal.), 762 (Misc.)
 Progrès de l'Aluminium, 777 (B.R.)
 Provost, J., with Sicé, Boisseau & Deniel, 901 (S.S.)
 Puntigam, F., 143 (Mal.)
 Puntoni, V., 419 (Myc.)
 Purdy, J. S., 834 (Misc.)
 Puscariu, E. & Nitzulescu, J., 968 (Oph.)
 Puymartin, C., with Laignel-Lavastine & Boquien, (740) (Lept.)

Q

Quenardel & Kimsan, (801) (Am.)
 Quinnell, E., with Ashford, 699 (Und.)
 Quiyum, M. A., 50 (Misc.)

R

Rabello, E., 414 (Der.)
 Radhma, W., 73, 74 (Misc.)
 —, with Parjona & Joenoes, 862 (Misc.)

Radosavljević, A., 603 (Mal.)
 Ragain, L., 965 (Oph.)
 Rajewski, A. S., 333 (Lep.)
 Rajewsky, A. S., (658) (Lep.)
 Raju, R. B. V. G. & Sircar, B. L., (438) (Chl.)
 Raju, S., with Nair, (13) (Bl.)
 Raju, V. G., 435 (Chl.)
 — & Sarkar, A. K., 885 (Chl.)
 Rakshit, A., with Dhur-Roy, (658) (Lep.)
 Raman, T. K., with Mahadevan, 455 (Bb.)
 Ramos y Silva, J., 400 (Der.)
 Rampon, L., 157 (K.A.)
 Ramsay, G. C., 579 *bis* (Mal.)
 Ramsay, G. W. St. C., 555 (Lab.)
 Ramsey, G. H., 714 (Y.F.)
 Randria, S., 393 (Pl.)
 Raney, R. B., (280) (Dys.)
 Rangoon, 560 (Lab.)
 Ranjeva, J. B., 174 (Hel.)
 Rao, K. R., 577 (Mal.)
 Rao, S. S., 171, 212, 683 (Hel.)
 —, with Acton, 212, 213 *bis*, 682 (Hel.)
 —, with Chopra & Choudhury, 216 (Hel.)
 — & Iyengar, M. O. T., 212 (Hel.)
 Rasaoamanana, G., 875 (Pl.)
 Rastegaieff, E. F., with Yakimoff, 306 (R.F.)
 Ratner, M. I., with Kritschewski & Semzova, 855 (Misc.)
 Ravaut, P., with Levaditi, Lépine & Schoen, 937, 938 (C.Bu.)
 Raybaud, A., 100, 627 (Fev.), 140 (Mal.), (307) (R.F.)
 —, with Pieri, 627 (Fev.)
 Raymond-Hamet, (280) (Dys.)
 Raynal, J., 670 (Hel.)
 Ré, P. M., with Molinelli, 332 (Lep.)
 Read, H., 688 (Hel.)
 Records of the Malaria Survey of India, 105, 577 (Mal.)
 Reddingius, T., 549 (Z)
 Reed, A. C., 468 (Pel.), 790 (Am.)
 Regendanz, P., 374, 918, (925) (S.S.)
 Rehbein, M., 1011 (Mal.)
 Reimann, H. A., with Chung, 643 (K.A.)
 Reiner, K. & Leonard, C. S., 359 (S.S.)
 —, — & Chao, S. S., 359 (S.S.)
 Remlinger, P., 75 (Misc.), 255 (Rab.)
 — & Bailly, J., 243, 250, 254, 255, (257 *bis*), 741 *bis*, 742 *bis*, 744, 747, 750, 751 (Rab.), 303, 304 (R.F.)
 —, Palmowitch, S. M. & Bailly, J., 745 (Rab.)
 Remontet, E., with Vialatte, 140 (Mal.)
 Renaud, (692) (Hel.)
 Rennie, D. C., 887 (H.S.)
 Revue de Médecine et d'Hygiène Tropicales, 159 (K.A.), 787 (Am.)
 Rey, J. C., with Dassen, (241) (Hel.)
 Reynolds, F. H. K., with St. John & Simmons, 507 (Z.), 613 (B.R.)
 —, with Simmons & St. John, 114 (Mal.)
 Reyntjes, E. J., with Walch & van Breemen, 1028 (Mal.)
 Rezende, M. & Sobrinho, J. M., 936 (C.Bu.)
 Rho, F., 57, 839 (Misc.), (729) (Y.F.)
 Rhodes, W. F., 391 (Pl.)
 Rice, E. M., 986 (Mal.)
 Richard, L., with Nattan-Larrier, 874 (Pl.)
 Richardson, C. H. & Shepard, H. H., 509 (Z.)

- Richmond, A. E. & Mendis, J. C., 105 (Mal.)
 Ridder, 800 (Dys.)
 Riding, D., 272, 797 (Dys.)
 Ridlon, J. R., 315 (Lept.)
 Riegl, R., with Tsykalas, 190 (Hel.)
 Riley, W. A., 115 (Mal.)
 Rille, J. H., 474 (Pel.)
 Rinehart, J. F. & Anderson, H. H., 850 (Misc.)
 Riou, with Toullec, (964) (Lep.)
 Rjabowa, M., with Skliar, 594 (Mal.)
 Robert-Lévy, with de Lavergne & Kaiser, 311 (Lept.)
 Roberts, C. E., 942 (Bl.)
 Roberts, M. A. W., 66 (Misc.)
 Robertson, A., 317 (R.B.F.), 378 (S.S.)
 Robertson, E. A., 231 (Hel.)
 Robertson, R. L., 48 (Misc.)
 Robic, J., 35 (Misc.)
 Rocca, G. C., with Dominici, 145 (Mal.)
 Rocchi, F., 1021 (Mal.)
 Rocha, F., (1032) (Mal.)
 da Rocha, M., (801) (Am.)
 Rockefeller Foundation, 168 (B.R.)
 Rodecurt, M., 491 (Z.)
 Rodenwaldt, E. R. K. & Cohen, A. J., 85 (Und.)
 Röder, R., 1034 (B.R.)
 Rodhain & Houssiau, F., 219 (Hel.)
 Rodham, J., 689 (Hel.)
 Rodriguez, J. N., 474 (Pel.)
 Rodriguez Lopez-Neyra, C., (242) (Hel.)
 Roe, J. H., with Whitmore, 6 (Bl.), 107 (Mal.)
 Roesle, E., 29 (Misc.)
 Roest, P. K., (866) (Misc.)
 Rogers, L., 38, 39, 856 (Misc.), (658) (Lep.)
 Rogers, L. M., with Goldberger, Wheeler & Sebrell, 473 (Pel.)
 Romaña, C., with Mazza & Schürmann, 923 (S.S.)
 Rombach, K. A., (148) (Mal.)
 Romeo, N., 203 (Hel.)
 Ronnefeldt, F., (611) (Mal.), 790 (Am.), 861 (Misc.)
 de Rook, H., with Brug, 217 (Hel.)
 — & Soesilo, R., (552) (Z.)
 da Rosa, A. F., with da Fonseca, Jr., 401 (Der.)
 Rosa, B., 751 (Rab.)
 Rosenthal, S. M. & Voegtlin, C., 60 (Misc.)
 Roskin, G., 911, 912 (S.S.)
 Roskott, E. R. A. L., 771 (Misc.)
 Ross, F., 48 (Misc.)
 Ross, G. A. P., 766 (Misc.), (1032) (Mal.)
 Ross, R., 814 (Hist.)
 Roubaud, E., 506 (Z.)
 — & Toumanoff, C., 507, 509 (Z.)
 Roudinesco, with Sézary, 657 (Lep.)
 Rousset, J., with Doubrow, 234 *bis* (Hel.)
 —, with Garin & Gonthier, 233 (Hel.)
 Roux, P., with Buchanan, 796 (Dys.)
 Row, R., 145, 1023 (Mal.), 155 (K.A.)
 Row, R. S. T. M., with Dikshit, 959 (Lep.)
 Roy, A., 655 (Lep.)
 Roy, A. C., with Boyd, 51 (Misc.), 216 (Hel.)
 Roy, D. N. & Chowdhury, K. L., 112 (Mal.)
 —, with Strickland, 1018 (Mal.)
 Rubinato, G., (103) (Fev.)
 Rubino, C., 961 (Lep.)
 Rubino, M. C., 960 *bis* (Lep.)
 Rubinstein, P. L., 71 (Misc.)
 — & Golubewa, E. E., 70 (Misc.)
 Rudnew, G. P., with Akulowa, 388 (Pl.)
 — & Krumberg, A. J., 703 (Und.)
 —, with Stradomsky, Petrowsky & Popow, 142 (Mal.)
 —, with Tinker, 390 (Pl.)
 Rudolf, M., with Lemierre, 948 (Bl.)
 Ruffino, P., with Spoto, 957 (Lep.)
 Ruiz, F. R. & Fotheringham, W. T., 452 (C.Bu.)
 Rukke, G. V., 878 (Pl.)
 Rule, A. M., with Kolmer, 907 (S.S.)
 Russell, King & Pandit, 381 (Pl.)
 Russell, H., 730 (R.F.)
 —, with Hawe, 244 (Rab.)
 Russell, P. F., 1011 (Mal.)
 Russo, C., 384 (Pl.)
 Rustomjee, K. J., 610 (Mal.)
 Rutledge, W., 534 (Z.)
 Rybinsky, S. B., 989 (Mal.)
 Ryrrie, C. A., 669 (Hel.)
- 8
- Sabolotnow, P. & Schmidt, B., 394 (Pl.)
 Sabrazès, J., 652 (Lep.), (801) (Am.)
 Sadler, E. S., Dilling, W. J. & Gemmell, A. A., 848 (Misc.)
 Sadowsky, I. J., with Glusman & Solowjewa, 244 (Rab.)
 Sagel, W., 300 (R.F.)
 Sainte-Marie, P. E. F., with Vialatte, 994 (Mal.)
 St John, J. H., Simmons, J. S. & Reynolds, F. H. K., 507 (Z.)
 —, with — & —, 114 (Mal.), 613 (B.R.)
 Saito, J., 534 (Z.)
 Saldanha, J. L., with Gharpure, 783 (Am.)
 Salisbury, E. I. & [Corrigan, J. A.], 107, (Mal.)
 Samson, J. G., Lara, C. B. & Cruz, M. C., 329 (Lep.)
 Sanders, E. P., with Cleveland, 791, 792 (Am.)
 Sanders, J., (148) (Mal.)
 Sanfilippo, E., 704 (Und.)
 Sanguinetti, L. V., (801) (Am.)
 Sankin, S. L., with Limtscher, 673 (Hel.)
 Sanner, 52 (Misc.)
 Sargent, W. S., 447 (Y. & S.)
 Sarkar, A. K., with Raju, 885 (Chl.)
 Sarkar, S. L., 165 (K.A.), (611), (1032) (Mal.)
 Sarkisian, A. B., 605 (Mal.)
 Sarraon, 434 (Chl.)
 Sartory, A., Meyer, M. & Meyer, J., 424 (Myc.)
 Sassykina, T., with Iwanowsky, 391 *bis* (Pl.)
 Sathe, R. G., 388 (Pl.)
 Sato, K., with Nagayo, Tamiya & Mitamura, 635 (Fev.)
 Sato, S., with Ota, 962 *bis* (Lep.)
 Sato, T., with Minami, 183 (Hel.)
 Sautet, J., 172 (Hel.), (866) (Misc.)
 Sawhney, M. R., 475 (Oph.)
 Sayers, E. G., 46 (Misc.)
 Scensnowic, W., with Kudrjawzew, 666 (Hel.)
 Schachow, S. D., with Orlowa, 514 (Z.)

- Schadow, H., 1000 (Mal.)
 Schaffle, K., with Colby, 232 (Hel.)
 Schander, R. & Götze, G., 835 *bis* (Misc.)
 Schapiro, L., 229 (Hel.)
 — & Cort, W. W., 174 (Hel.)
 —, with Kritschewski & Grünbaum, 854 (Misc.)
 Scharff, J. W., (611) (Mal.)
 Schaumann, O., (280) (Dys.)
 Schern, K., (925) (S.S.)
 Schewelewa, E. M., with Wolsky, 132 (Mal.)
 Schichobalowa, N. P., with Skrjabin & Podjapolskaya, 208 (Hel.)
 Schilling, C., 59 (Misc.), 586 (Mal.), 894 (S.S.)
 — & Schreck, H., 484 *bis* (Z.)
 Schipitsina, N. K., 512 (Z.)
 Schjenti, A., 176 (Hel.)
 Schlingman, A. S., 750 (Rab.)
 Schlossmann, K., 333 (Lep.)
 Schmelewa, A. A., 226 (Hel.)
 Schmidt, B., with Sabolotnow, 394 (Pl.)
 Schmidt, G. W., with Doerr, 208 (Hel.)
 Schneider, H., 606 (Mal.)
 Schneider, O., 650 (Lep.), (867) (Misc.)
 Schöbl, O., 443, 444 *quat.*, 445 *bis* (Y. & S.)
 — & Garcia, O., 443 (Y. & S.)
 —, Tanabe, B. & Miyao, I., 443 (Y. & S.)
 Schockaert, J., 317 (R.B.F.)
 Schoen, R., with Levaditi, Anderson & Selbie, 302 (R.F.)
 —, with —, Ravaut & Lépine, 937, 938 (C.Bu.)
 Schoening, H. W., 748 (Rab.)
 Schorlemmer, R., (1032) (Mal.)
 Schotte, A., 839 (Misc.)
 Schourenkova, A. & Nossina, V., 497 (Z.)
 Schousboé, 968 (Oph.)
 Schreck, H., with Schilling, 484 *bis* (Z.)
 Schüffner, W., 164 (K.A.)
 —, Dinger, J. E. & Snijders, E. P., 718 (Y.F.)
 Schüffner, W. A. P., with — & —, 291, 295 (Y.F.)
 —, with —, — & Swellengrebel, 290, 725 (Y.F.)
 Schuhardt, V. T., with Chandler & Milliken, 217 (Hel.)
 Schulman, E. S., with Skrjabin & Althausen, 683 (Hel.)
 Schumaker, E., 496 *bis* (Z.)
 Schürmann, K., with Mazza & Romaña, 923 (S.S.)
 Schütz, F., 884 (Chl.)
 Schwartz, A., Azam, A. & Yovanovitch, M., 181 (Hel.)
 Schwartz, L. S., with Fradkin, 41 (Misc.)
 Schweinburg, F., with Löffler, 745 (Rab.)
 — & Windholz, F., 246 (Rab.)
 Schwetz, J., 493, 501, 503 (Z.), 585 (Mal.), 764 (Misc.)
 — & Baumann, H., 173 *bis*, 194 (Hel.)
 —, — & Cabu, F., 128 (Mal.)
 Scott, E. L. & McKinley, E. B., 425 (Myc.)
 Scott, G. W., (13) (Bl.), 121 (Mal.)
 Scott, H., 622 (Fev.)
 Scott, H. H., 28 (Misc.), 821 (Hist.)
 Scott, J. A., 241 (Hel.)
 Scriabine, K. I., Podjapolskaya, B. P. & Statirova, N. A., 182 (Hel.)
 Scriver, J. B. & Waugh, T. R., 845 (Misc.)
 Sebenzow, B. M., with Adowa, 511 (Z.)
 Sebrell, W. H., with Goldberger, 473 (Pel.)
 —, with —, Wheeler & Rogers, 473 (Pel.)
 Sédan, J., 477, 968 (Oph.)
 Ségal, J., 604 (Mal.)
 Selbie, F. R., with Levaditi, Anderson & Schoen, 302 (R.F.)
 Self, P. A. W. & Corfield, C. E., (867) (Misc.)
 Sellei, J., 448 (Y. & S.)
 Semenza, C., 644, 645 (K.A.)
 Semzova, O. M., 316 (Lept.), 735 (R.F.)
 —, with Kritschewski & Ratner, 855 (Misc.)
 Sen, A. K., 164 (K.A.)
 Sen, A. N., 882 (Chl.)
 Sen, P. B., with Brahmachari & Banerjea, 642 (K.A.)
 Sen, R., 798 (Dys.)
 Sena, J. A., with Adrougué, 327 (Lep.)
 Senevet, G. & Champagne, R., 182 (Hel.)
 —, with Sergeant, Edm., Sergeant, Et., Parrot, Foley & Catanei, 984 (Mal.)
 Senior-White, R. A., 105 (Mal.)
 Sequeira, J. H., 815 (Hist.)
 Serebrennaja, A. I., with Palawandow, 245 *bis*, 741 (Rab.)
 Sergeant, A., with Sergeant, Edm., Sergeant, Et., Catanei & Trens, 1013 (Mal.)
 Sergeant, Edm., Sergeant, Et. & Catanei, A., 592 (Mal.)
 —, —, —, Trens, F. & Sergeant, A., 1013 (Mal.)
 —, —, Parrot, L., Foley, H., Catanei, A. & Senevet, G., 984 (Mal.)
 Sergeant, Et. & Catanei, A., 599 (Mal.)
 —, with Sergeant Edm. & Catanei, 592 (Mal.)
 —, with —, —, Trens & Sergeant, A., 1013 (Mal.)
 —, with —, Parrot, Foley, Catanei & Senevet, 984 (Mal.)
 Serio, F., (801) (Am.)
 Serpa, R., with Peña Chavarria & Bevier, 281 (Y.F.)
 Serra, A., 665 (Hel.)
 Serra, G., with van Nitsen, Lejeune, Miguens & Van den Branden, 439 (Y. & S.)
 Seshadrinathan, N., 648 (K.A.)
 —, with Vasudevan, 403 (Der.)
 Sézary, A. & Roudinesco, 657 (Lep.)
 —, with Vaudremer & Brun, 657 (Lep.)
 Shah, K. S., with Jacob, 81 (Misc.)
 Shaha, B., 880 (Chl.)
 Shaha, B. B., 463 (Bb.)
 Shanks, G., 462 (Bb.)
 Shannon, R. C., 513 (Z.)
 —, with Davis, 727 (Y.F.)
 — & Junior, J. S., (553) (Z.)
 Shapiro, with Arnold, 435 (Chl.)
 Shapland, C. D., with Daggart, 969 (Oph.)
 Sharma, A. N., 171 (Hel.)
 Sharp, E. A., 179 (Hel.)
 Sharples, L. R., 54 (Misc.)
 Shattuck, G. C. & Goodner, K., 447 (Y. & S.)
 —, with Goodner, 773 (Misc.)
 Shawki, I., 276 (Dys.)
 Shelley, H. M., 465 (Pel.), 943 (Bl.)
 Shepard, H. H., with Richardson, 509 (Z.)
 Shetti, E. R., 479 (Oph.)

- Shiha, M. M., 595 (Mal.)
 Shillong, 560 (Lab.)
 Shimokawa, H., with Chin-Kyu-Sui & Kami-
 zawa, (866), (867) (Misc.)
 Shircore, J. O., 12 (Bl.)
 Shortt, 639 (K.A.)
 Shortt, H. E., 578 (Mal.)
 —, Smith, R. O. A. & Swaminath, C. S.,
 516 (Z.)
 Shousha, A. T., 883 (Chl.)
 Shrewsbury, J. F. D., 529 (Z.)
 Shrivastava, D. L., with Hughes, 598 (Mal.)
 Shute, P. G., with James & Nicol, 973 (Mal.)
 Sicé, A., 351, 356, 903 (S.S.)
 — & Boisseau, R., 243 (Rab.), 379 (S.S.)
 —, Provost, J. & Deniel, 901 (S.S.)
 Sidari, C., 1006 (Mal.)
 Sieburgh, G., 1020 (Mal.)
 da Silva, E. P., 747, 752 (Rab.)
 Silva, F., 163 (K.A.), 401 (Der.)
 — & de Araujo, E., 165 (K.A.), 405 (Der.)
 da Silva-Mello, A., (280) (Dys.)
 Silvan, P., 44 (Misc.)
 da Silveira, F., with Belfort, 856 (Misc.)
 Silverman, D. N. & Feenster, R., 797 (Dys.)
 Simic, T., 270, 793 (Am.)
 Simmons, J. S., St. John, J. H. & Reynolds,
 F. H. K., 114 (Mal.), 613 (B.R.)
 —, with — & —, 507 (Z.)
 Sinclair, B. A., 635 (Fev.)
 Singh, J., 141, 1025 (Mal.)
 —, with Sinton & Harbhagwan, 587 (Mal.)
 Sinha, H. K., (438) (Chl.)
 Sinjuschina, M. N., with Kritschewski, 737
 (R.F.)
 Sinton, J. A., 517, (553) *bis* (Z.), 577, 596, 598,
 (1032) (Mal.)
 —, Harbhagwan & Singh, J., 587 (Mal.)
 — & Kehar, N. D., 508 (Z.), 1024 (Mal.)
 — & Mulligan, H. W., 146 (Mal.)
 Sioe, K. T., 169 (Hel.)
 Sircar, B. L., with Raju, (438) (Chl.)
 Skliar, N. & Rjabowa, M., 594 (Mal.)
 Skrjabin, K. I., Althausen, A. J. & Schulman,
 E. S., 683 (Hel.)
 —, Podjapolskaya, W. P. & Schichobalowa,
 N. P., 208 (Hel.)
 Skrjabin, K. J. & —, 675 (Hel.)
 Slot, J. A., (740) (Lept.), 849 (Misc.)
 Smirnow, G. G., 175 (Hel.)
 Smith, E. C., 48, 838 *bis* (Misc.), 294 (Y.F.), 398,
 411 *bis*, 412 (Der.), 441 (Y. & S.)
 Smith, G. D., with Baumgartner, 661 (Sp.)
 Smith, H. F., 713 (Y.F.)
 Smith, H. M., 955 (Lep.)
 Smith, O. A., with Phelps, Carroll, Washburn
 & Beagley, 215 (Hel.)
 Smith, R. O. A., with Shortt & Swaminath,
 516 (Z.)
 Smith, S., 750 (Rab.)
 Smyly, H. J., 277 (Dys.)
 Smyth, F. G. A. & Cameron, W. M., 102 (Fev.)
 Snijders, E. P., 619 (Fev.), 1000 (Mal.)
 — & Dinger, J. E., 728 (Y.F.)
 —, with — & Schüffner, 291, 295 (Y.F.)
 —, with —, — & Swellengrebel, 290,
 725 (Y.F.)
 —, with Schüffner & Dinger, 718 (Y.F.)
 Snyder, J. W., 788 (Am.)
 Sobrinho, J. M., with Rezende, 936 (C.Bu.)
 Soerobroto, M. A., 695 (B.R.)
 Soesilo, R., with de Rook, (552) (Z.)
 Soewandi, (280) (Dys.)
 Sofieff, M. S., 300 (R.F.)
 —, with Chodukin, 155 (K.A.)
 Soga, A. R. B., 768 (Misc.)
 Sohler, R., with Jausion, 416 (Myc.)
 Sollier, N., with Dubois, 87, 704 (Und.)
 Solowjewa, J. W., with Glusman, 746 (Rab.)
 —, with — & Predtetschenskaja, 244
 (Rab.)
 —, with — & Sadowsky, 244 (Rab.)
 Sommermeyer, V., with Holder & Osborne,
 791 (Am.)
 Sondag, A. V. A., 773 (Misc.)
 Sophiew, M. S., with Chodoukine & Chewt-
 chenko, 641 (K.A.)
 Sorapure, V. E., with Armand-Delille &
 Hurst, 56 (Misc.)
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